

BRITISH STANDARDS INSTITUTION

2 PARK STREET, LONDON W1A 2BS

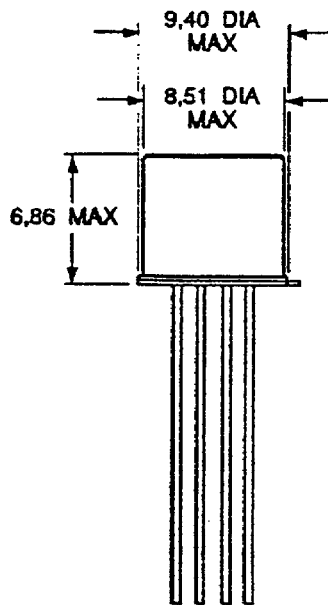
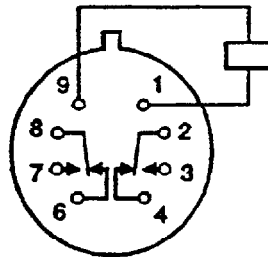
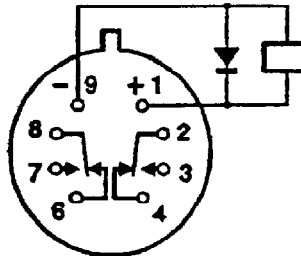
Page
1 of
15CECC 16101-048
ISSUE 1 (AMENDMENT 1)
NOVEMBER 1994SPECIFICATION AVAILABLE FROM: As shown in PD 9002, CECC 00 200,
and TELEDYNE RELAYS - SCOTLAND

9-13 Napier Road, Wardpark North Industrial Estate, Cumbernauld G68 0EF

ELECTRONIC COMPONENTS OF ASSESSED QUALITY

DETAIL SPECIFICATION IN ACCORDANCE WITH: CECC 16 000 Issue 2

CECC 16 100 Issue 1

BS CECC 16 101-048
ISSUE 1 (AMENDMENT 1)**MANUFACTURER'S**
TYPE: C412. For ordering
information see clause 10**OUTLINE AND DIMENSIONS:****Basic relay****With coil
transient
suppression
diode****TYPES:** Electromechanical,
all-or-nothing relay, mono-
stable, polarized by diode or
non-polarized, two pole
change-over, break-before-
make contact arrangement
(2 form C), low level to 1 A,
28 V d.c., sensitive, with
optional diode for coil
transient suppression.**CONSTRUCTION:** All
welded metal enclosure,
hermetically sealed.**APPLICATION:** Relays
according to this standard are
provided for the operation in
equipment and/or installations
with increased mechanical and
environmental requirements.
The applicable load is from
low level to 1 A.**TEST SCHEDULE:** Test
schedule 3 with additions

- Wiring diagram marked on top; figure shows terminal view
- Terminal references are not marked on the relay
- Terminals and mounting variants in Annex A
- Dimensions in mm
- Marking information: see clause 7

COIL DATA:

Rated voltage (V d.c.)	Coil variant code
5,0	A
6,0	B
9,0	C
12,0	D
18,0	E
26,5	F

CONTACTS:

Contact arrangement: 2 change-over, break-before-make
 Low-level load: 10 mA max. / 30 mV max.
 High-level load: rated contact voltage: 28 V d.c.
 contact current: $I_1 = 1 \text{ A}$, resistive load
 $I_2 = 0,1 \text{ A}$, $L = 320 \text{ mH}$

TEMPERATURE RANGE:

Ambient temperature: -65 °C to +125 °C

Refer to Qualified Products List CECC 00 200 for details of manufacturers approved to this specification.

1. Related documents

CECC 16 000 Issue 2	(1990)	Generic Specification: Electromechanical All-or-Nothing Relays, Part I: General
CECC 16 100 Issue 1	(1979)	Sectional Specification: Electromechanical All-or-Nothing Relays
CECC 00 114/II Issue 2	(1991)	Quality Assessment Procedures, Part II: Qualification Approval of Electronic Components
IEC 68-1	(1988)	Environmental testing, Part 1: General and guidance
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
ISO 2859-1	(1989)	Part 1: Specification for sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection

2. Characteristic values of the relay

2.1. General data:

- Contact application categories: 0, 1 and 2
- Contact arrangement: 2 change-over, break-before-make
- Mass (weight): 2,55 g max.
- Finish of the terminals: gold plated or tinned
- Insulation resistance: 10 000 M Ω min. at 500 V d.c. unless otherwise stated in Table 6
- Dielectric withstanding voltage: see Table 1
- Nominal internal free volume: 0,126 cm³

Table 1 Dielectric test voltages

Test point	V a.c. min.
Open contacts	500
Between adjacent contacts	500
Contacts to case	500
Coil to contacts	500
Coil to case	500

2.2. Construction of designation (ordering information):

	Relay	CECC 16 101	-	048	F	B	O	1
Denomination								
CECC number								
Type code (CECC registration number)								
Coil variant (according to 2.3)								
Terminals (according to 2.5 and Annex A)								
Mounting (according to 2.6 and Annex A)								
Coil transient suppression diode (according to 2.3)								

2.3. Coil and energization data (see Table 2)

Table 2 Coil and energization data for relays with and without a coil transient suppression diode

Coil variant Code	Voltage V d.c.		Coil resistance at 25 °C Ω $\pm 10\%$	Operate voltage V d.c. max. at		Release voltage				Coil transient suppression code number *
	rated	max.		25 °C	125 °C	V d.c. non-release at		V d.c. must release at		
						25 °C	125 °C	25 °C	-65 °C	
A	5	5,8	50	2,7	3,5	1,4	2,3	0,22	0,14	1
B	6	8,0	98	3,5	4,5	2,0	3,2	0,28	0,18	1
C	9	12,0	220	5,3	6,8	3,0	4,9	0,54	0,35	1
D	12	16,0	390	7,0	9,0	4,0	6,5	0,63	0,41	1
E	18	24,0	880	10,5	13,5	6,0	10,0	0,91	0,59	1
F	26,5	32,0	1560	14,2	18,0	8,0	13,0	1,37	0,89	1
* Without the coil transient suppression diode the code number is 0										

2.4. Contact data

2.4.1. Static contact resistance (at approximately 3,18 mm from the emergence of the lead from the seating plane of the relay)

Initial: 100 m Ω max.After electrical life: 200 m Ω max.

2.4.2. Dynamic contact resistance

33 Ω max.

Table 3 Data for endurance and overload

Description	Load voltage and current	Switching cycles	Switching frequencies
Low level	30 mV max. / 10 mA max.	100 000	5 $\pm$ 0,5 per s
Resistive I ₁	28 V d.c. / 1 A	100 000	20 $\pm$ 2 per min
Inductive *	28 V d.c. / 0,1 A (L = 320 mH)	100 000	10 $\pm$ 1 per min
Resistive overload *	28 V d.c. / 2 A	100	20 $\pm$ 2 per min
* Values are for information only and not for inspection purposes			

2.4.3. Timing (Over the whole temperature range):

- Operate time: 2,0 ms max.
- Release time: 1,5 ms max.
- Release time with diode: 4,0 ms max.
- Bounce time: 1,5 ms max.

2.5. Terminals (see Table 4 and Annex A)

Table 4 Types of terminals

Code	Length of terminals	Finish
O	4,75 ^{+1,02} _{-0,25} mm	Gold plated or tinned
P	19,05 mm min.	Gold plated or tinned
R	38,10 mm min.	Gold plated or tinned
B	4,75 ^{+1,02} _{-0,25} mm	Tinned
C	4,75 ^{+1,02} _{-0,25} mm	Gold plated
D	19,05 mm min.	Tinned
E	19,05 mm min.	Gold plated
M	38,10 mm min.	Tinned
N	38,10 mm min.	Gold plated

Relays with terminal codes O, B, or C have exposed base metal at the free end.

2.6. Mounting (see Table 5 and Annex A)

Table 5 Types of mounting

Code	Type of mounting
O	Without mounting hardware accessories

2.7. Environmental data

The relays shall withstand at least the following environmental stresses:

- shock: 735 m/s² (75 G), half-sine acceleration, 6 ms duration
- bump: 392 m/s² (40 G), peak acceleration, 6 ms duration
- vibration (sinusoidal): the lesser of 2,47 mm peak displacement, or 294 m/s² (30 G), peak acceleration, 10 Hz to 2000 Hz
- robustness of terminals:

Test U _{a1} tensile:	5 N
Test U _b bending:	2,5 N
Test U _c torsion:	45° in both directions, long leads only

3. Formation of inspection lots

According to 3.1 of CECC 00 114/II.

4. Intervals between tests

- Intervals between Test Group C, Sub-Groups C2, C3, and C4 shall be one year
- Intervals between Test Group C, Sub-Group C5 shall be two years

5. Qualification approval

- as stated in 1.4 of CECC 00 114/II “fixed sampling”
- sampling and test schedule are specified in Table 7
- the tests specified and their order are mandatory

6. Quality conformance inspection

Quality conformance inspection contains the tests stated in Table 6

- Group A and B tests for inspection lots acceptance
- Group C tests for periodic inspection

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.