

CU-B/C relay - High contact life

Datasheet



Description

Miniature industrial relay with two change-over contacts. Equipped with magnetic arc blow-out for higher contact life. The contacts are weld-no-transfer contacts: they are mechanically forced in the same position. Relay for plug-in mounting (CU version) or for PCB mounting (CP version).

Optional built-in LED (red or green colour) to indicate presence of power supply and energizing of the coil (only CU).

The construction of the relay and choice of materials makes the CU-B/C relay suitable to withstand corrosive atmospheres, low and high temperatures, shock & vibrating and dry to very humid environments.

With a very compact design and a wide range of sockets, the CU-B/C relay is an easy and flexible solution to use.

Application

These relay series are designed for industrial applications where available space is limited. The CU-B/C is used in applications where a high contact life is required.

Features

- Miniature plug-in / PCB relay
- Instantaneous 2 C/O contacts
- Weld-no-transfer contacts
- Magnetic arc blow-out
- Optional built-in LED (red or green colour)
- Suitable for AC or DC voltage
- Flat, square and tin plated relay pins for excellent socket connection / PCB mounting pins
- Wide range sockets
- Transparent cover
- Optional positive mechanical keying relay to socket

Benefits

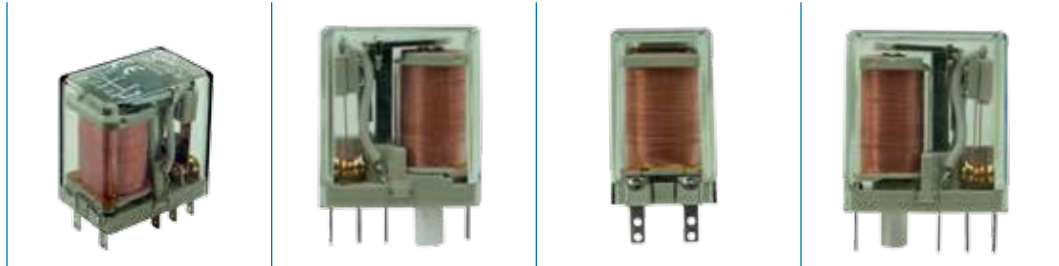
- Proven reliable
- Long term availability
- Used in safety critical applications
- Low life cycle cost
- No maintenance

Industry compliancy

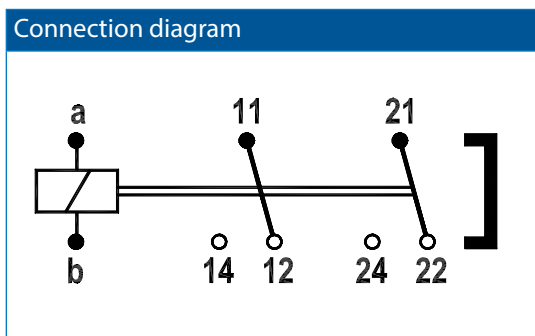
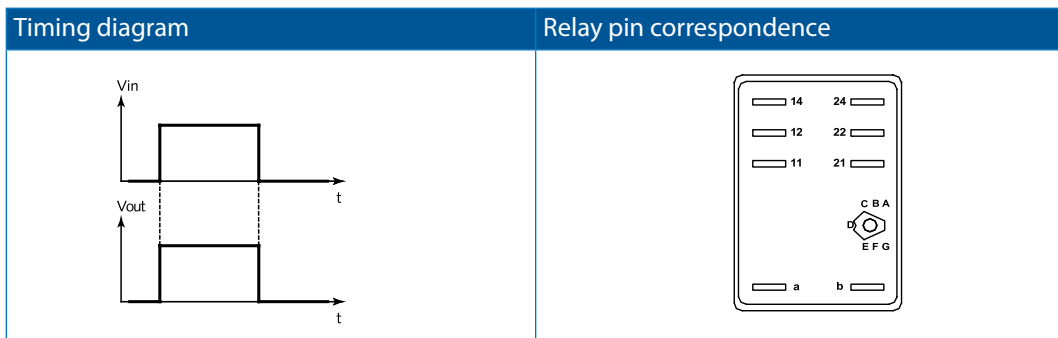
- IEC 61810 Electromechanical elementary relays
- IEC 60947 Low voltage switch gear and control gear
- IEC 60947-5-1 Electromechanical control circuit devices and switching elements
- IEC 60255 Relay design and environmental conditions
- CE

CU-B/C relay

Technical specifications



Functional and connection diagrams



CU-B/C relay

Technical specifications

Coil characteristics

Operating times at nominal voltage (typical value):	
Pull-in time	≤ 12 ms
Release time	≤ 5 ms
Bounce time N/O contacts	≤ 1 ms
Bounce time N/C contacts	≤ 1 ms
Inductance L/R at U _{nom} :	7 ms
Operating voltage range	80 %...110 % U _{nom}

Type	U _{nom} (VDC)	U _{min} (VDC)	U _{max} (VDC)	U _{drop-out} (VDC)	R _{coil} (Ω)
CU-B42	12	9.6	13.2	1.2	165
CU-B36	24	19.2	26.4	2.4	600
CU-B30	48	38.4	52.8	4.8	2500
CU-B28	60	48.0	66.0	6.0	3800
CU-B23	110	88.0	121.0	11.0	12887
CU-B22	120	96.0	132.0	12.0	15371

Type	U _{nom} (VAC)	U _{min} (VAC)	U _{max} (VAC)	U _{drop-out} (VAC)	R _{coil} (Ω)
CU-C48	12	9.6	13.2	1.2	40
CU-C42	24	19.2	26.4	2.4	165
CU-C35	48	38.4	52.8	4.8	780
CU-C28	110	88.0	121.0	11.0	3800
CU-C22	220	176.0	242.0	22.0	15371

Other types on request

Note: the R_{coil} is measured at room temperature and has a tolerance of ± 10%

Remarks:

- U_{min} is the must-operate voltage at which the relay has picked up in all circumstances (worst-case situation), in practice the relay picks up at a lower voltage
- U_{drop-out} is the must-release voltage at which the relay has dropped-out in all circumstances (worst-case situation), in practice the relay drops out at a higher voltage
- Always select the nominal voltage as close as possible to the actual voltage in the application
- AC voltage: 50/60 Hz



CU-B/C relay

Technical specifications

Contact characteristics

Amount and type of contacts	2 C/O
Maximum make current	10 A
Maximum continuous current	8 A (AC1 ; IEC 60947)
Maximum switching voltage	300 VDC (then max. current = 300 mA) 250 VAC (then max. current = 2,6 A)
Minimum switching voltage	12 V
Minimum switching current	10 mA
Maximum contact resistance	15 mΩ
Maximum switching capacity	See graph page 7
Material	Ag
Contact gap	1.0 mm
Contact force	> 20 cN

Note : contacts cannot have a different position (forced contacts, weld-no-transfer)

Electrical characteristics

Dielectric strength	
Pole-Pole	IEC 60255-5 2.3 kV, 50 Hz, 1 min
Cont-Coil	IEC 60077 3.5 kV, 50 Hz, 1 min
Insulation between open contacts	2.2 kV; 50 Hz; 1 min
Pulse Withstanding	IEC 60255-5 5 kV (1.2/50 μs)

Mechanical characteristics

Mechanical life	10 x 10 ⁶ operations
Maximum switching frequency	Mechanical: 3600 ops/h Electrical: 1200 ops/h
Weight	40 g



CU-B/C relay

Technical specifications

Environmental characteristics

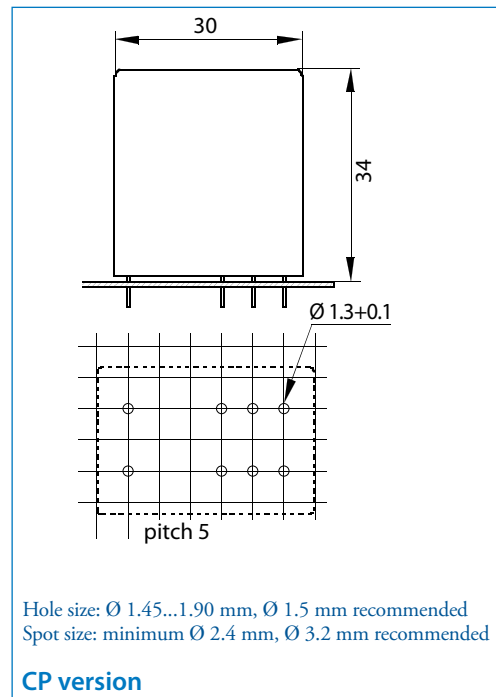
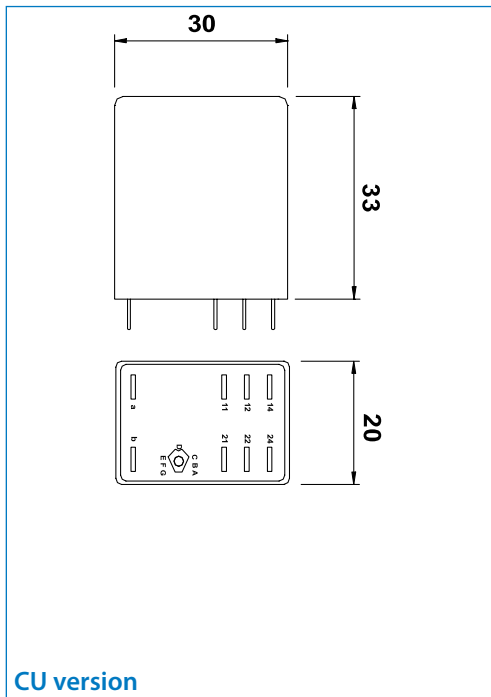
Environmental	EN 50125-1 and IEC 60077-1
Vibration	IEC 61373, Category I, Class B, Body mounted (relay in socket including retaining clip)
Shock	IEC 61373, Category I, Class B, Body mounted (relay in socket including retaining clip)
Operating temperature	-40 °C...+85 °C
Humidity	95% (condensation is permitted temporarily)
Salt mist	IEC 60068-2-11, class ST4
Damp heat	IEC 60068-2-30, Test method Db variant 1
Protection	IEC 60529, IP40 (relay on socket)
Fire & smoke	NF F 16101, NF F16102, EN 45545-2
Insulation materials	Cover: polycarbonate Base: polyester



CU-B/C relay

Technical specifications

Dimensions (mm)



Options

Code	Description	Remark	Cannot be combined with:
Lg	Green LED	Only CU version	Lr
Lr	Red LED	Only CU version	Lg
U	Double make / double break (1 C/O)		

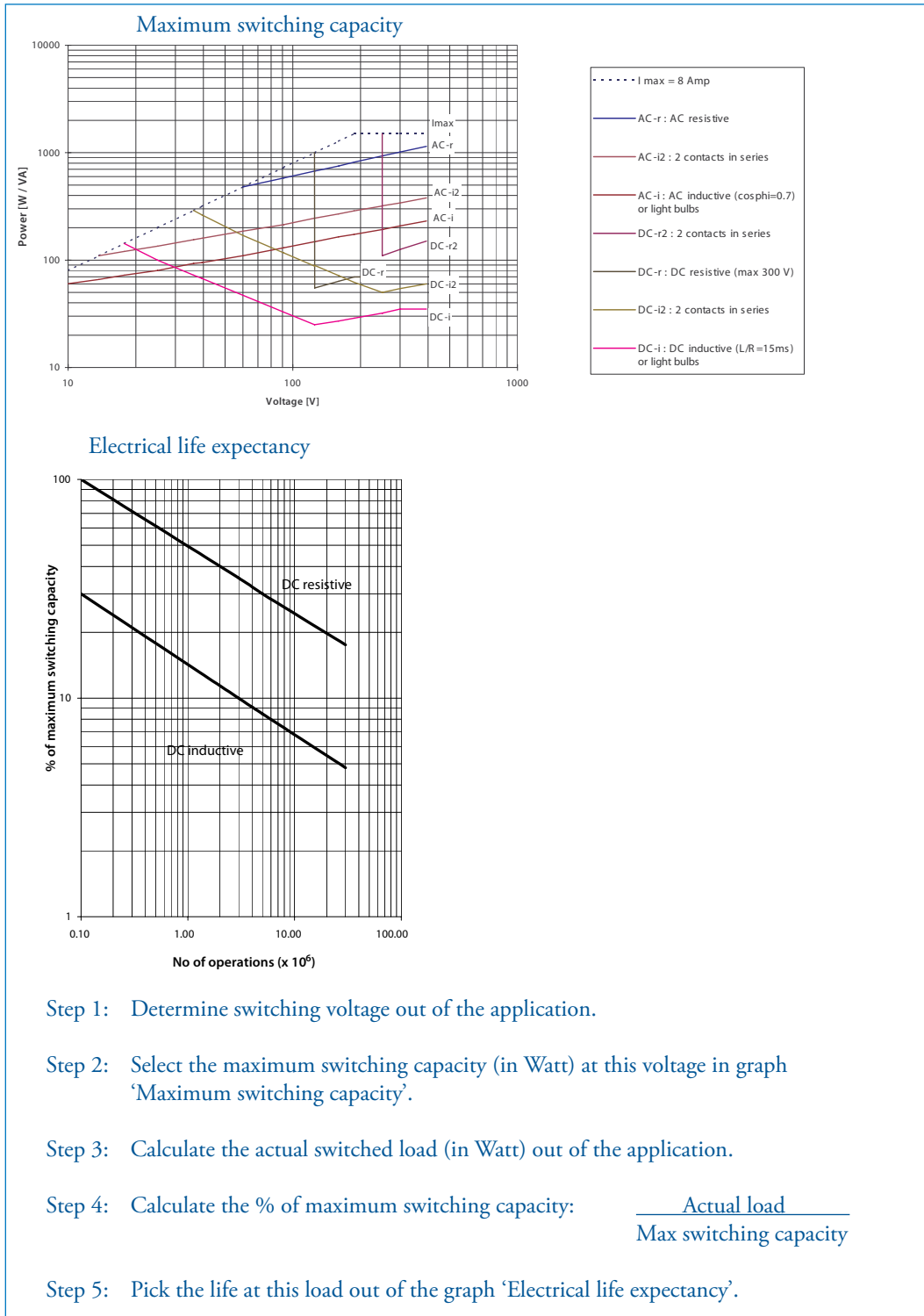
Example LED in CU relays:



CU-B/C relay

Technical specifications

Switching capacity and contact life



CU-B/C relay

Mounting possibilities / sockets



General

The CU-G/W can be mounted in any position except with the connecting pins pointing upwards.

Relays and sockets are all tested to the IEC 61373 but when the CU-Uxxx relay is mounted in a socket suitable for rail mounting it is not recommended to mount the socket with the spring side up (that means for recommended rail mounting: contacts 14-12-22-24 upwards).

Wall / rail mounting

338001500	V16	Relay socket, screw terminal, 2 retaining clips
338001501	V16-D	.... with diode
338001502	V16-Q1	.... with double zener (nom. voltage relay: 12 V - 30 V)
338001503	V16-Q2	.... with double zener (nom. voltage relay: 30 V - 45 V)
338001504	V16-Q3	.... with double zener (nom. voltage relay: 45 V - 60 V)
338001505	V16-Q4	.... with double zener (nom. voltage relay: 65 V - 90 V)
338001506	V16-Q5	.... with double zener (nom. voltage relay: 90 V - 150 V)
338001400	V17	Cage clamp socket, wall /rail mount, front connection *
338001401	V17-D	..... with back EMF diode *
338001402	V17-Q1	.....with double zener diode, 12 V...30 V *
338001403	V17-Q2	..... with double zener diode, 30 V...45 V *
338001404	V17-Q3	..... with double zener diode, 45 V...65 V *
338001405	V17-Q4	..... with double zener diode, 65 V...90 V *
338001406	V17-Q5	..... with double zener diode, 90 V...150 V *

* Wire size: max 2.5 mm²

PCB mounting

338000620	V18	Relay socket for soldering on PCB
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CU-B/C relay

Keying

Mechanical keying relay and socket (optional)



Function:

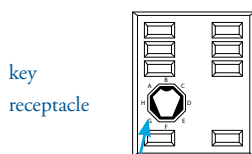
- To prevent wrong installation
- To prevent damage to equipment
- To prevent unsafe situations

Using keyed relays and sockets prevents a relay being inserted in a wrong socket. For example it prevents placing a 24 VDC relay in a 110 VDC circuit. Positive discrimination is possible per different function, coil voltage, timing, monitoring, safety and non-safety.

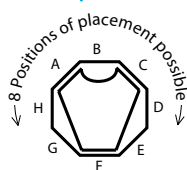
The CU-Series relay socket keying option gives 8 possibilities. Upon ordering the customer simply indicates the need for the optional keying. Mors Smitt will assign a code to the relay and fix the pins into the relay. The sockets are supplied with loose key receptacles. Inserting the keys into the socket is very simple and self explaining.

Remark: sockets and relay shown are only examples.

Top view socket

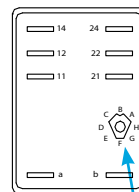


key
receptacle

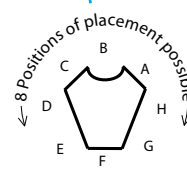


Example keying position F on socket

Bottom view relay



keying pin



Example keying position F on relay



CU-B/C relay Instructions

Installation, operation & inspection

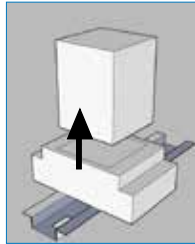
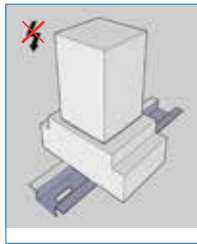
Installation

Before installation or working on the relay: disconnect the power supply first!

Install socket and connect wiring according to the terminal identification. Plug relay into the socket ensuring there is no gap between the bottom of relay and the socket. Reverse installation into the socket is not possible due to the mechanical blocking of the standard keying inside CU relays. Check to ensure that the coil connection polarity is not reversed. Relays can be mounted tightly together to save space.

Warning!

- Never use silicon in the proximity of the relays.
- Do not use the relay in the presence of flammable gas as the arc generated from switching could cause ignition.
- To remove relays from the socket, pull the relay in a straight line out of the socket. Sideway movement may cause damage to the coil wires. When a V17 socket is used, extracting tool A171 (502110000) is required.



Operation

Always use the relay within its specifications. After installation always apply the rated voltage to the coil to check correct operation. Long term storage may corrode the tin plating on the relay pins. When plugging the relay into the socket, the female bifurcated receivers will automatically cut through the corrosion on the pins and guarantee a reliable connection.

Before actual use of relays, it is advised to switch the load several times with the contacts. The contacts will both be electrically and mechanically cleaned due to the positive wiping action. Sometimes a contact can build up increased contact resistance ($\leq 15 \text{ m}\Omega$ when new). When using silver contacts one can clean the contact by switching a contact load a few times using $>24 \text{ VDC}$ & $\sim 2 \text{ A}$. Increased contact resistance is not always problematic, as it depends on circuit conditions. In general a contact resistance of 1Ω is no problem, consult Mors Smitt for more information.

Condensation in the relay is possible when the coil is energised (warm) and the outside, environmental temperature is cold. This is a normal phenomenon and will not affect the function of the relay. Materials in the relay have no hygroscopic properties.

Inspection

Correct operation of the relay can easily be checked as the transparent cover provides good visibility of the moving contacts. If the relay does not seem to operate correctly, check for presence of the appropriate coil voltage and polarity using a suitable multimeter. If coil voltage is present, but the relay does not operate, a short circuit of the suppression diode if present in the socket, is possible (this may be due to the coil connection having been reversed).

If the relay doesn't work after inspection, replace the relay unit with a similar model. Do not attempt to open the relay cover or try to repair. Contacts are calibrated and in balance, touching can affect proper operation. Also re soldering may affect correct operation.

Most relay defects are caused by installation faults such as over voltage, spikes/transients, high/short current far exceeding the relay specifications. When returning the relays for investigation, please provide all information on the RMA form. Send defective relays back to the manufacturer for repair or replacement. Normal wear and tear or external causes are excluded from warranty.



CU-B/C relay

Ordering scheme



1. Relay model 2. Type & coil voltage 3. Options

This example represents a **CU-B36-E**.

Description: CU-B relay (plug-in), U_{nom} : 24 VDC, gold plated contacts

1. Relay model

CU	Plug-in model
CP	PCB model

2. Relay type & coil voltages

B42	12 VDC
B36	24 VDC
B30	48 VDC
B28	60 VDC
B23	110 VDC
B22	120 VDC
C48	12 VAC, 50/60 Hz
C42	24 VAC, 50/60 Hz
C35	48 VAC, 50/60 Hz
C28	110 VAC, 50/60 Hz
C22	220 VAC, 50/60 Hz

3. Options

E	Gold plated contacts
Lg	Green LED
Lr	Red LED

Upon ordering indicate keying if necessary





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