

# Pluggable interface relays CR-M

## Miniature relays









Pluggable interface relays are used for electrical isolation, amplification and signal matching between the electronic controlling, e.g. PLC (programmable logic controller), PC or field bus systems and the sensor / actuator level. They don't use additional internal protective circuits and thus are overload-proof against short-time variations like current or voltage peaks.



### Characteristics

- Standard miniature relays with mechanical status indication
- 12 different rated control supply voltages:  
DC versions: 12 V, 24 V, 48 V, 60 V, 110 V, 125 V, 220 V  
AC versions: 24 V, 48 V, 60 V, 110 V, 120 V, 230 V
- Output: 2 c/o (SPDT) contacts (12 A), 3 c/o (SPDT) contacts (10 A) or 4 c/o (SPDT) contacts (6 A)
- Available with or without LED
- 4 c/o (SPDT) contact version optionally equipped with gold contacts, LED and free wheeling diode
- Integrated test button for manual actuation and locking of output contacts (blue =DC, orange = AC) that can be removed if necessary
- Cadmium-free contact material
- Suited for logical and standard sockets
- Width on socket: 27 mm (1.063 in)
- Pluggable function modules: reverse polarity protection/ free wheeling diode, LED indication, RC elements, overvoltage protection

### Approvals

	UL508	(except 60 V DC and 125 V DC devices with gold contacts)
	CAN/CSA C22.2 No.14	(except devices with gold contacts)
	CAN/CSA C22.2 No.14	(except 60 V DC and 125 V DC devices)
	VDE	(except 125 V DC devices)
	GOST	
	Lloyd's Register	(only devices with 4 c/o (SPDT) contacts)
	CCC	
	RMRS	

### Marks

 CE

## Order data

Bold printed products = stocked products. Packing unit = 10 pieces

### Interface relays without LED, 2 c/o (SPDT) contacts: 250 V, 12 A

Type	Rated control supply voltage U <sub>s</sub>	Order code
CR-M012DC2	12 V DC	1SVR 405 611 R4000
<b>CR-M024DC2</b>	<b>24 V DC</b>	<b>1SVR 405 611 R1000</b>
CR-M048DC2	48 V DC	1SVR 405 611 R6000
CR-M060DC2	60 V DC	1SVR 405 611 R4200
CR-M110DC2	110 V DC	1SVR 405 611 R8000
CR-M125DC2	125 V DC	1SVR 405 611 R8200
CR-M220DC2	220 V DC	1SVR 405 611 R9000
<b>CR-M024AC2</b>	<b>24 V AC</b>	<b>1SVR 405 611 R0000</b>
CR-M048AC2	48 V AC	1SVR 405 611 R5000
<b>CR-M110AC2</b>	<b>110 V AC</b>	<b>1SVR 405 611 R7000</b>
CR-M120AC2	120 V AC	1SVR 405 611 R2000
<b>CR-M230AC2</b>	<b>230 V AC</b>	<b>1SVR 405 611 R3000</b>

### Interface relays without LED, 3 c/o (SPDT) contacts: 250 V, 10 A

CR-M012DC3	12 V DC	1SVR 405 612 R4000
<b>CR-M024DC3</b>	<b>24 V DC</b>	<b>1SVR 405 612 R1000</b>
CR-M048DC3	48 V DC	1SVR 405 612 R6000
CR-M060DC3	60 V DC	1SVR 405 612 R4200
CR-M110DC3	110 V DC	1SVR 405 612 R8000
CR-M125DC3	125 V DC	1SVR 405 612 R8200
CR-M220DC3	220 V DC	1SVR 405 612 R9000
<b>CR-M024AC3</b>	<b>24 V AC</b>	<b>1SVR 405 612 R0000</b>
CR-M048AC3	48 V AC	1SVR 405 612 R5000
CR-M060AC3	60 V AC	1SVR 405 612 R5200
<b>CR-M110AC3</b>	<b>110 V AC</b>	<b>1SVR 405 612 R7000</b>
CR-M120AC3	120 V AC	1SVR 405 612 R2000
<b>CR-M230AC3</b>	<b>230 V AC</b>	<b>1SVR 405 612 R3000</b>

### Interface relays without LED, 4 c/o (SPDT) contacts: 250 V, 6 A

CR-M012DC4	12 V DC	1SVR 405 613 R4000
<b>CR-M024DC4</b>	<b>24 V DC</b>	<b>1SVR 405 613 R1000</b>
CR-M048DC4	48 V DC	1SVR 405 613 R6000
CR-M060DC4	60 V DC	1SVR 405 613 R4200
CR-M110DC4	110 V DC	1SVR 405 613 R8000
CR-M125DC4	125 V DC	1SVR 405 613 R8200
CR-M220DC4	220 V DC	1SVR 405 613 R9000
<b>CR-M024AC4</b>	<b>24 V AC</b>	<b>1SVR 405 613 R0000</b>
CR-M048AC4	48 V AC	1SVR 405 613 R5000
<b>CR-M110AC4</b>	<b>110 V AC</b>	<b>1SVR 405 613 R7000</b>
CR-M120AC4	120 V AC	1SVR 405 613 R2000
<b>CR-M230AC4</b>	<b>230 V AC</b>	<b>1SVR 405 613 R3000</b>

## Interface relays with LED, 2 c/o (SPDT) contacts: 250 V, 12 A

Type	Rated control supply voltage U <sub>s</sub>	Order code
CR-M012DC2L	12 V DC	1SVR 405 611 R4100
<b>CR-M024DC2L</b>	<b>24 V DC</b>	<b>1SVR 405 611 R1100</b>
CR-M048DC2L	48 V DC	1SVR 405 611 R6100
CR-M060DC2L	60 V DC	1SVR 405 611 R4300
CR-M110DC2L	110 V DC	1SVR 405 611 R8100
CR-M125DC2L	125 V DC	1SVR 405 611 R8300
CR-M220DC2L	220 V DC	1SVR 405 611 R9100
<b>CR-M024AC2L</b>	<b>24 V AC</b>	<b>1SVR 405 611 R0100</b>
CR-M048AC2L	48 V AC	1SVR 405 611 R5100
<b>CR-M110AC2L</b>	<b>110 V AC</b>	<b>1SVR 405 611 R7100</b>
CR-M120AC2L	120 V AC	1SVR 405 611 R2100
<b>CR-M230AC2L</b>	<b>230 V AC</b>	<b>1SVR 405 611 R3100</b>

## Interface relays with LED, 3 c/o (SPDT) contacts: 250 V, 10 A

CR-M012DC3L	12 V DC	1SVR 405 612 R4100
<b>CR-M024DC3L</b>	<b>24 V DC</b>	<b>1SVR 405 612 R1100</b>
CR-M048DC3L	48 V DC	1SVR 405 612 R6100
CR-M060DC3L	60 V DC	1SVR 405 612 R4300
CR-M110DC3L	110 V DC	1SVR 405 612 R8100
CR-M125DC3L	125 V DC	1SVR 405 612 R8300
CR-M220DC3L	220 V DC	1SVR 405 612 R9100
<b>CR-M024AC3L</b>	<b>24 V AC</b>	<b>1SVR 405 612 R0100</b>
CR-M048AC3L	48 V AC	1SVR 405 612 R5100
<b>CR-M110AC3L</b>	<b>110 V AC</b>	<b>1SVR 405 612 R7100</b>
CR-M120AC3L	120 V AC	1SVR 405 612 R2100
<b>CR-M230AC3L</b>	<b>230 V AC</b>	<b>1SVR 405 612 R3100</b>

## Interface relays with LED, 4 c/o (SPDT) contacts: 250 V, 6 A

CR-M012DC4L	12 V DC	1SVR 405 613 R4100
<b>CR-M024DC4L</b>	<b>24 V DC</b>	<b>1SVR 405 613 R1100</b>
CR-M048DC4L	48 V DC	1SVR 405 613 R6100
CR-M060DC4L	60 V DC	1SVR 405 613 R4300
CR-M110DC4L	110 V DC	1SVR 405 613 R8100
CR-M125DC4L	125 V DC	1SVR 405 613 R8300
CR-M220DC4L	220 V DC	1SVR 405 613 R9100
<b>CR-M024AC4L</b>	<b>24 V AC</b>	<b>1SVR 405 613 R0100</b>
CR-M048AC4L	48 V AC	1SVR 405 613 R5100
<b>CR-M110AC4L</b>	<b>110 V AC</b>	<b>1SVR 405 613 R7100</b>
CR-M120AC4L	120 V AC	1SVR 405 613 R2100
<b>CR-M230AC4L</b>	<b>230 V AC</b>	<b>1SVR 405 613 R3100</b>

## Interface relays with LED and free wheeling diode, 4 c/o (SPDT) contacts: 250 V, 6 A

CR-M024DC4LD	24 V DC	1SVR 405 614 R1100
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## Interface relays with gold contacts, 4 c/o (SPDT) contacts: 250 V, 6 A

<b>CR-M024DC4G</b>	<b>24 V DC</b>	1SVR 405 618 R1000
<b>CR-M024AC4G</b>	<b>24 V AC</b>	1SVR 405 618 R0000
<b>CR-M110AC4G</b>	<b>110 V AC</b>	1SVR 405 618 R7000
<b>CR-M230AC4G</b>	<b>230 V AC</b>	1SVR 405 618 R3000

Interface relays with LED and gold contacts, 4 c/o (SPDT) contacts: 250 V, 6 A

Type	Rated control supply voltage $U_s$	Order code
CR-M012DC4LG	12 V DC	1SVR 405 618 R4100
<b>CR-M024DC4LG</b>	<b>24 V DC</b>	<b>1SVR 405 618 R1100</b>
CR-M048DC4LG	48 V DC	1SVR 405 618 R6100
CR-M060DC4LG	60 V DC	1SVR 405 618 R4300
CR-M110DC4LG	110 V DC	1SVR 405 618 R8100
CR-M125DC4LG	125 V DC	1SVR 405 618 R8300
CR-M220DC4LG	220 V DC	1SVR 405 618 R9100
<b>CR-M024AC4LG</b>	<b>24 V AC</b>	<b>1SVR 405 618 R0100</b>
CR-M048AC4LG	48 V AC	1SVR 405 618 R5100
<b>CR-M110AC4LG</b>	<b>110 V AC</b>	<b>1SVR 405 618 R7100</b>
CR-M120AC4LG	120 V AC	1SVR 405 618 R2100
<b>CR-M230AC4LG</b>	<b>230 V AC</b>	<b>1SVR 405 618 R3100</b>

Interface-relays with gold contacts, LED and free wheeling diode, 4 c/o (SPDT) contacts: 250 V, 6 A

<b>CR-M012DC4LDG</b>	<b>12 V DC</b>	<b>1SVR 405 618 R4400</b>
<b>CR-M024DC4LDG</b>	<b>24 V DC</b>	<b>1SVR 405 618 R1400</b>

Accessories

Bold printed products = stocked products. Packing unit = 10 pieces

Function modules

Type	Rated control supply voltage $U_s$	Version	Order code
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Diode - Reverse polarity protection

CR-P/M 22	6-230 V DC	A1+, A2-	1SVR 405 651 R0000
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Diode and LED - Reverse polarity protection

CR-P/M 42	6-24 V DC	red, A1+, A2-	1SVR 405 652 R0000
CR-P/M 42V	6-24 V DC	green, A1+, A2-	1SVR 405 652 R1000
CR-P/M 42B	24-60 V DC	red, A1+, A2-	1SVR 405 652 R4000
CR-P/M 42BV	24-60 V DC	green, A1+, A2-	1SVR 405 652 R4100
CR-P/M 42C	110-230 V DC	red, A1+, A2-	1SVR 405 652 R9000
CR-P/M 42CV	110-230 V DC	green, A1+, A2-	1SVR 405 652 R9100

RC element - Arc elimination

CR-P/M 52B	6-24 V AC		1SVR 405 653 R0000
CR-P/M 52D	24-60 V AC		1SVR 405 653 R4000
CR-P/M 52C	110-230 V AC		1SVR 405 653 R1000

Diode and LED

CR-P/M 62	6-24 V AC/DC	red, for DC: A1+, A2-	1SVR 405 654 R0000
CR-P/M 62V	6-24 V AC/DC	green, for DC: A1+, A2-	1SVR 405 654 R1000
CR-P/M 62E	24-60 V AC/DC	red, for DC: A1+, A2-	1SVR 405 654 R4000
CR-P/M 62EV	24-60 V AC/DC	green, for DC: A1+, A2-	1SVR 405 654 R4100
CR-P/M 92	110-230 V AC/DC	red, for DC: A1+, A2-	1SVR 405 654 R0100
CR-P/M 92V	110-230 V AC/DC	green, for DC: A1+, A2-	1SVR 405 654 R1100

## Varistor and LED - Overvoltage protection

CR-P/M 62C	6-24 V AC/DC	red, for DC: A1+, A2-	1SVR 405 655 R0000
CR-P/M 62CV	6-24 V AC/DC	green, for DC: A1+, A2-	1SVR 405 655 R1000
CR-P/M 62D	24-60 V AC/DC	red, for DC: A1+, A2-	1SVR 405 655 R4000
CR-P/M 62DV	24-60 V AC/DC	green, for DC: A1+, A2-	1SVR 405 655 R4100
CR-P/M 92C	110-230 V AC/DC	red, for DC: A1+, A2-	1SVR 405 655 R0100
CR-P/M 92CV	110-230 V AC/DC	green, for DC: A1+, A2-	1SVR 405 655 R1100

## Varistor - Overvoltage protection

CR-P/M 72	24 V AC		1SVR 405 656 R0000
CR-P/M 72A	115 V AC		1SVR 405 656 R1000
CR-P/M 82	230 V AC		1SVR 405 656 R2000

## Sockets

Type	Version	Connection	Order code
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### Logical sockets

CR-M2LS	for 2 c/o (SPDT) contacts	screw	1SVR 405 651 R1100
CR-M3LS	for 3 c/o (SPDT) contacts	screw	1SVR 405 651 R2100
CR-M4LS	for 2 or 4 c/o (SPDT) contacts	screw	1SVR 405 651 R3100
CR-M2LC	for 2 c/o (SPDT) contacts	spring	1SVR 405 651 R1200
CR-M4LC	for 2 or 4 c/o (SPDT) contacts	spring	1SVR 405 651 R3200

### Standard sockets

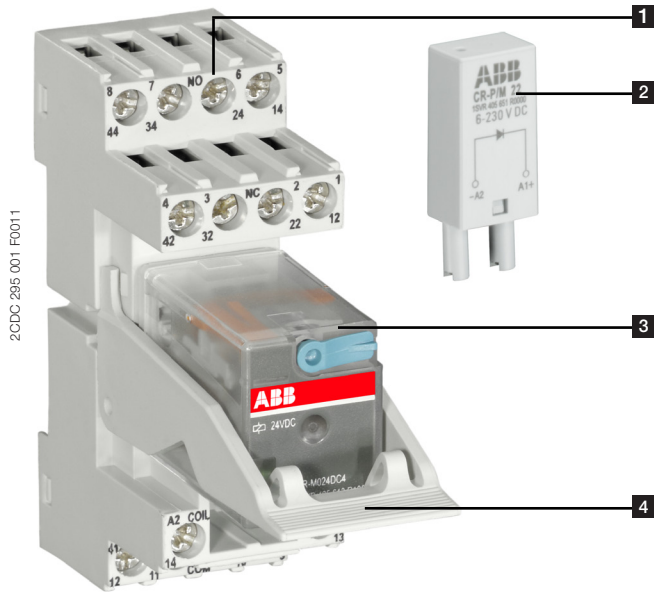
CR-M2SS	for 2 c/o (SPDT) contacts	screw	1SVR 405 651 R1000
CR-M3SS	for 3 c/o (SPDT) contacts	screw	1SVR 405 651 R2000
CR-M4SS	for 2 or 4 c/o (SPDT) contacts	screw	1SVR 405 651 R3000
CR-M2SF	for 2 c/o (SPDT) contacts	fork type screw	1SVR 405 651 R1300
CR-M4SF	for 2 or 4 c/o (SPDT) contacts	fork type screw	1SVR 405 651 R3300

### Accessories for CR-M sockets

CR-MH	Plastic holder		1SVR 405 659 R1000
CR-MH1	Metall holder		1SVR 405 659 R1100
CR-MJ	Jumper bar for sockets with screw clamps		1SVR 405 658 R6000

## Functions

### Operating controls



- 1 Socket
- 2 Pluggable function module
- 3 Interface relay
- 4 Holder

### Application

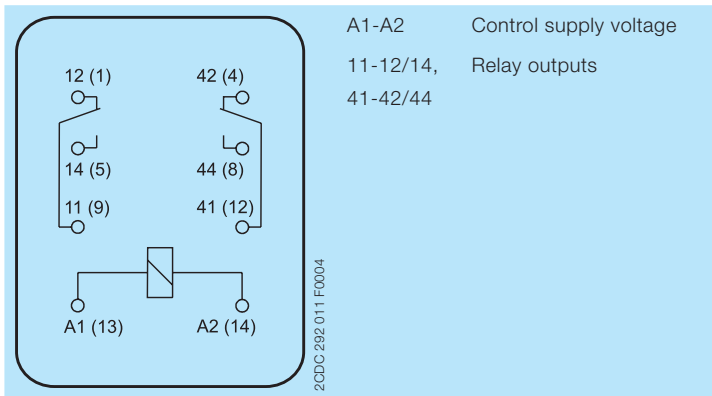
Interface relays are electromechanic and electronic input and output modules for electrical isolation, levelling, noise suppression or signal amplification between control unit and process.

### Operating mode

When control supply voltage is applied, the output contacts get closed. When control supply voltage is switched off, the contacts fall back into their starting position. Manual operation and locking of the output relays is possible via the integrated test button.

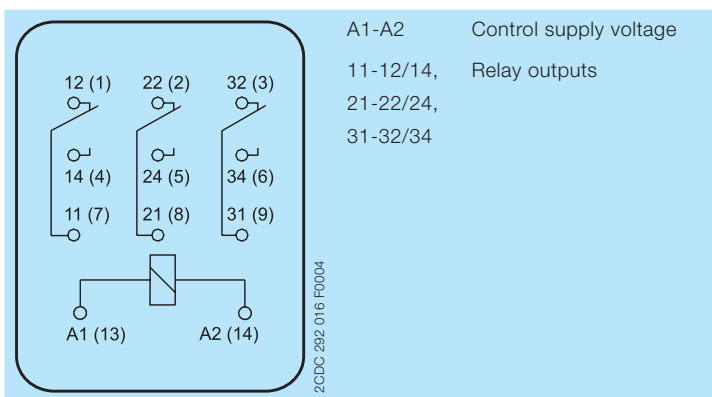
## Electrical connection

### CR-M with 2 c/o (SPDT) contacts



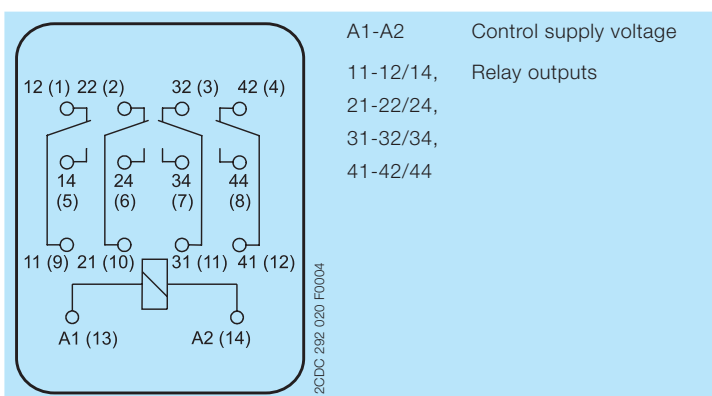
Connection diagram

### CR-M with 3 c/o (SPDT) contacts



Connection diagram

### CR-M with 4 c/o (SPDT) contacts



Connection diagram

## Technical data

### Input circuit - Coil data A1-A2

	Rated control supply voltage $U_s$	Rated frequency	Make voltage (at 20 °C)	Maxium voltage (at 55 °C)	Break voltage	Rated power	Coil resistance (at 20 °C)	Tolerance of coil resistance
DC coils	12 V DC	-	9.6 V DC	13.2 V DC	$\geq 0.1 U_s$	0.9 W	160 $\Omega$	$\pm 10 \%$
	24 V DC	-	19.2 V DC	26.4 V DC	$\geq 0.1 U_s$	0.9 W	640 $\Omega$	$\pm 10 \%$
	48 V DC	-	38.4 V DC	52.8 V DC	$\geq 0.1 U_s$	0.9 W	2600 $\Omega$	$\pm 10 \%$
	60 V DC	-	48.0 V DC	66.0 V DC	$\geq 0.1 U_s$	0.9 W	4000 $\Omega$	$\pm 10 \%$
	110 V DC	-	88.0 V DC	121.0 V DC	$\geq 0.1 U_s$	0.9 W	13600 $\Omega$	$\pm 10 \%$
	125 V DC	-	100.0 V DC	137.5 V DC	$\geq 0.1 U_s$	0.9 W	16000 $\Omega$	$\pm 10 \%$
	220 V DC	-	176.0 V DC	242.0 V DC	$\geq 0.1 U_s$	0.9 W	54000 $\Omega$	$\pm 10 \%$
AC Coils	24 V AC	50 / 60 Hz	19.2 V AC	26.4 V AC	$\geq 0.2 U_s$	1.6 VA	158 $\Omega$	$\pm 10 \%$
	48 V AC	50 / 60 Hz	38.4 V AC	52.8 V AC	$\geq 0.2 U_s$	1.6 VA	640 $\Omega$	$\pm 10 \%$
	60 V AC	50 / 60 Hz	48.0 V AC	66.0 V AC	$\geq 0.2 U_s$	1.6 VA	930 $\Omega$	$\pm 10 \%$
	110 V AC	50 / 60 Hz	88.0 V AC	121.0 V AC	$\geq 0.2 U_s$	1.6 VA	3450 $\Omega$	$\pm 10 \%$
	120 V AC	50 / 60 Hz	96.0 V AC	132.0 V AC	$\geq 0.2 U_s$	1.6 VA	3770 $\Omega$	$\pm 10 \%$
	230 V AC	50 / 60 Hz	184.0 V AC	253.0 V AC	$\geq 0.2 U_s$	1.6 VA	16100 $\Omega$	$\pm 10 \%$

### Output circuits

Type		CR-M...2	CR-M...3	CR-M...4
Output circuits		11-12/14, 21-22/24	11-12/14, 21-22/24, 31-32/34	11-12/14, 21-22/24, 31-32/34, 41-42/44
Kind of output		Relay, 2 c/o (SPDT)	Relay, 3 c/o (SPDT)	Relay, 4 c/o (SPDT)
Contact material		AgNi	AgNi	AgNi AgNi/Au 5 $\mu\text{m}$
Rated operational voltage $U_e$ (VDE 0110, IEC 60947-1)		250 V		
Minimum switching voltage		5 V		
Maximum switching voltage		DC	250 V DC	
		AC	250 V AC	
Minimum switching current		5 mA (AgNi), 2 mA (AgNi/Au)		
Rated free air thermal current $I_{th}$		12 A	10 A	6 A
Rated operational current (IEC 60947-5-1)	AC12 (resistive) 230 V	12 A	10 A	6 A
	AC15 (inductive) 230 V	1.5 A	1.5 A	1 A
	DC12 (resistive) 24 V	12 A	10 A	6 A
	DC13 (inductive) 24 V	8 A	8 A	6 A
Minimum switching power		0.3 W (AgNi), 0.1 W (AgNi/Au)		
Maximum switching power	AC1	3000 VA	2500 VA	1500 VA
Contact resistance		$\leq 100 \text{ m}\Omega$		
Maximum switching capacity	rated load AC1	1200 switching cycles/h		
	without load	18000 switching cycles/h		
Mechanical lifetime		$> 2 \times 10^7$ switching cycles		
Electrical lifetime	electrical AC1 (resistive)	$> 10^5$ switching cycles		
		(12 A, 250 V)	(10 A, 250 V)	(6 A, 250 V)
	$\cos \varphi$	see Reduction factor F		
Response time		typ. 13 ms (DC), typ. 10 ms (AC)		
Release time		typ. 3 ms (DC), typ. 8 ms (AC)		



## Isolation data

Type		CR-M...2	CR-M...3	CR-M...4
Rated insulation voltage		250 V AC		
Insulation class		C250 / B250		
Rated impulse withstand voltage $U_{imp}$	between coil and contacts	2.5 kV AC		
	between open contacts	1.5 kV AC		
	between c/o (SPDT) contacts	2.5 kV AC		≥ 2 kV AC
Clearance	between coil and contacts	≥ 2.5 mm		≥ 1.6 mm
Creepage distance	between coil and contacts	≥ 4 mm		≥ 3.2 mm
Overvoltage category		III		II
Pollution degree		3		2

## General data

Type		CR-M...2	CR-M...3	CR-M...4
Dimensions (W x H x D) when mounted		21.2 x 27.5 x 35.6 mm (0.83 x 1.08 x 1.4 in)		
Weight		35 g (0.077 lb)		
Mounting		on socket (see accessories)		
Mounting position		any		
Degree of protection		IP 40		

## Electrical data

Type		CR-M...2	CR-M...3	CR-M...4
Connection		by socket		

## Environmental data

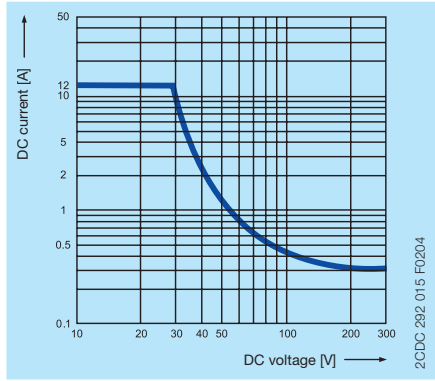
Type		CR-M...2	CR-M...3	CR-M...4
Ambient temperature range	operation	DC	-40...+70 °C	
		AC	-40...+55 °C	
	storage	-40...+85 °C		
Vibration resistance (10-150 Hz)	n/o contact	5 g		
	n/c contact	5 g		
Shock resistance	n/o contact	10 g		
	n/c contact	5 g		

## Standards

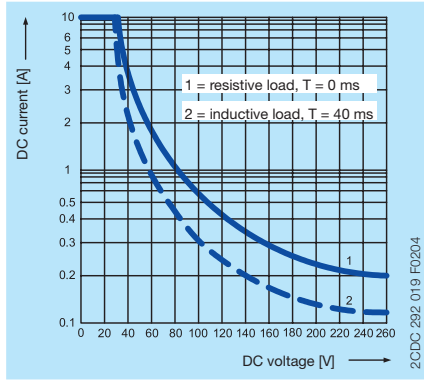
Type		CR-M...2	CR-M...3	CR-M...4
Product standard		EN 60810-1, EN 60255-23, IEC 61810-7		
Low Voltage Directive		2006/95/EC		

## Technical diagrams

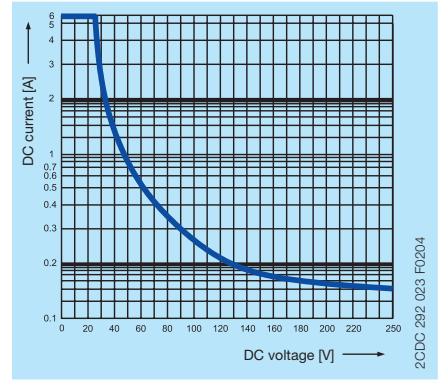
### Load limit curves - Maximum switching power at resistive DC load



Versions with 2 c/o (SPDT) contacts  
(CR-M ... 2)

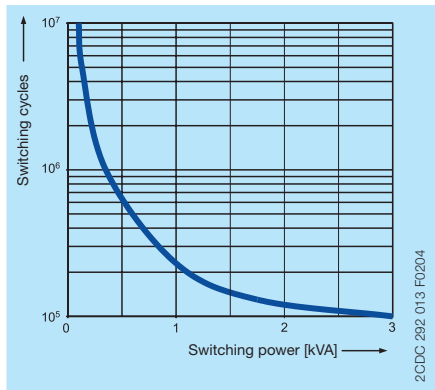


Versions with 3 c/o (SPDT) contacts  
(CR-M ... 3)

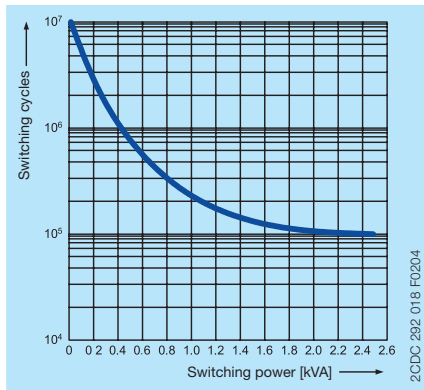


Versions with 4 c/o (SPDT) contacts  
(CR-M ... 4)

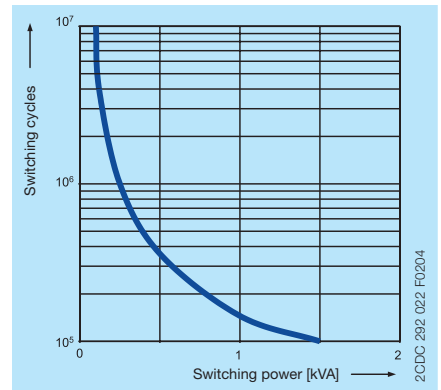
### Load limit curves - Electrical lifetime at resistive AC load



Versions with 2 c/o (SPDT) contacts  
(CR-M ... 2)

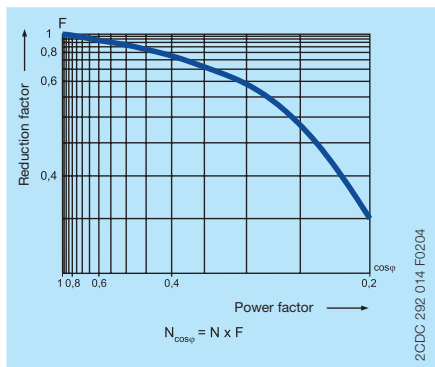


Versions with 3 c/o (SPDT) contacts  
(CR-M ... 3)



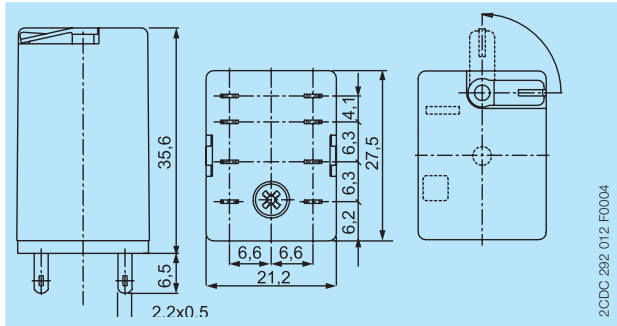
Versions with 4 c/o (SPDT) contacts  
(CR-M ... 4)

### Reduction factor F at inductive AC load

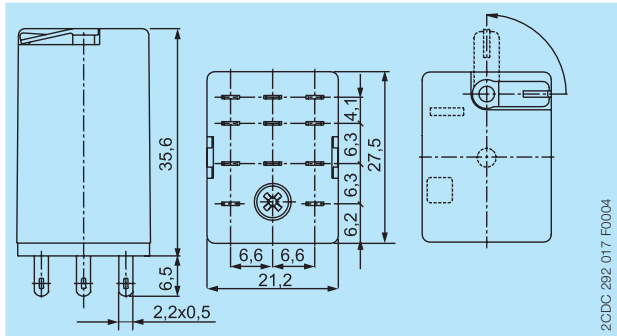


## Dimensions

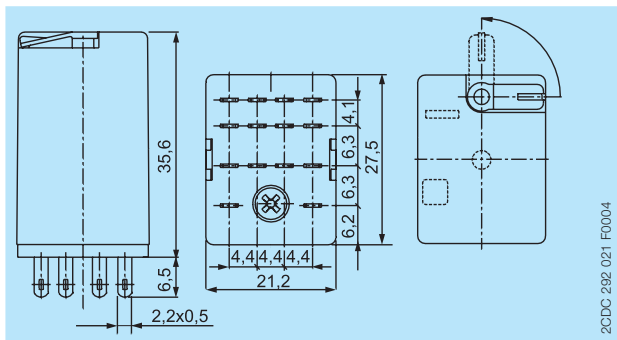
in mm



Versions with 2 c/o (SPDT) contacts (CR-M ... 2)



Versions with 3 c/o (SPDT) contacts (CR-M ... 3)



Versions with 4 c/o (SPDT) contacts (CR-M ... 4)

## Further documentation

Document title	Document type	Document number
Electronic Products and Relays	Technical catalogue	2CDC 110 004 C020x
Sockets CR-M	Data sheet	2CDC 117 005 D020x
Jumper bar CR-MJ	Data sheet	2CDC 117 015 D020x
Pluggable function modules CR-P/M	Data sheet	2CDC 117 007 D020x

You can find the documentation on the internet at [www.abb.com/lowvoltage](http://www.abb.com/lowvoltage) -> Control Products -> Electronic Relays and Controls -> Interface Relays and Optocouplers

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