

# 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.



2CDC 291 002 S0015

### Characteristics

- Standard miniature relays with mechanical status indication
- 13 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 (DC coil = blue, AC coil = orange) 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

	ANSI/UL 508, CAN/CSA C22.2 No.14	
	CAN/CSA C22.2 No.14	
	VDE	(except 125 V DC devices)
	EAC	
	Lloyds Register	(only devices with 4 c/o (SPDT) contacts)
	CCC	
	RMRS	(except 60 V and 125 V devices)

### Marks

CE

## Order data

Packing unit = 10 pieces

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

Type	Rated control supply voltage $U_s$	Order code
CR-M012DC2	12 V DC	1SVR 405 611 R4000
CR-M024DC2	24 V DC	1SVR 405 611 R1000
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
CR-M024AC2	24 V AC	1SVR 405 611 R0000
CR-M048AC2	48 V AC	1SVR 405 611 R5000
CR-M110AC2	110 V AC	1SVR 405 611 R7000
CR-M120AC2	120 V AC	1SVR 405 611 R2000
CR-M230AC2	230 V AC	1SVR 405 611 R3000

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

CR-M012DC3	12 V DC	1SVR 405 612 R4000
CR-M024DC3	24 V DC	1SVR 405 612 R1000
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
CR-M024AC3	24 V AC	1SVR 405 612 R0000
CR-M048AC3	48 V AC	1SVR 405 612 R5000
CR-M060AC3	60 V AC	1SVR 405 612 R5200
CR-M110AC3	110 V AC	1SVR 405 612 R7000
CR-M120AC3	120 V AC	1SVR 405 612 R2000
CR-M230AC3	230 V AC	1SVR 405 612 R3000

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

CR-M012DC4	12 V DC	1SVR 405 613 R4000
CR-M024DC4	24 V DC	1SVR 405 613 R1000
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
CR-M024AC4	24 V AC	1SVR 405 613 R0000
CR-M048AC4	48 V AC	1SVR 405 613 R5000
CR-M110AC4	110 V AC	1SVR 405 613 R7000
CR-M120AC4	120 V AC	1SVR 405 613 R2000
CR-M230AC4	230 V AC	1SVR 405 613 R3000

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

Type	Rated control supply voltage $U_g$	Order code
CR-M012DC2L	12 V DC	1SVR 405 611 R4100
CR-M024DC2L	24 V DC	1SVR 405 611 R1100
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
CR-M024AC2L	24 V AC	1SVR 405 611 R0100
CR-M048AC2L	48 V AC	1SVR 405 611 R5100
CR-M110AC2L	110 V AC	1SVR 405 611 R7100
CR-M120AC2L	120 V AC	1SVR 405 611 R2100
CR-M230AC2L	230 V AC	1SVR 405 611 R3100

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

CR-M012DC3L	12 V DC	1SVR 405 612 R4100
CR-M024DC3L	24 V DC	1SVR 405 612 R1100
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
CR-M024AC3L	24 V AC	1SVR 405 612 R0100
CR-M048AC3L	48 V AC	1SVR 405 612 R5100
CR-M110AC3L	110 V AC	1SVR 405 612 R7100
CR-M120AC3L	120 V AC	1SVR 405 612 R2100
CR-M230AC3L	230 V AC	1SVR 405 612 R3100

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

CR-M012DC4L	12 V DC	1SVR 405 613 R4100
CR-M024DC4L	24 V DC	1SVR 405 613 R1100
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
CR-M024AC4L	24 V AC	1SVR 405 613 R0100
CR-M048AC4L	48 V AC	1SVR 405 613 R5100
CR-M110AC4L	110 V AC	1SVR 405 613 R7100
CR-M120AC4L	120 V AC	1SVR 405 613 R2100
CR-M230AC4L	230 V AC	1SVR 405 613 R3100

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

CR-M024DC4G	24 V DC	1SVR 405 618 R1000
CR-M024AC4G	24 V AC	1SVR 405 618 R0000
CR-M110AC4G	110 V AC	1SVR 405 618 R7000
CR-M230AC4G	230 V AC	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 <sub>s</sub>	Order code
CR-M012DC4LG	12 V DC	1SVR 405 618 R4100
CR-M024DC4LG	24 V DC	1SVR 405 618 R1100
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
CR-M024AC4LG	24 V AC	1SVR 405 618 R0100
CR-M048AC4LG	48 V AC	1SVR 405 618 R5100
CR-M110AC4LG	110 V AC	1SVR 405 618 R7100
CR-M120AC4LG	120 V AC	1SVR 405 618 R2100
CR-M230AC4LG	230 V AC	1SVR 405 618 R3100

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

CR-M012DC4LDG	12 V DC	1SVR 405 618 R4400
CR-M024DC4LDG	24 V DC	1SVR 405 618 R1400

**Accessories**

Packing unit = 10 pieces

Function modules

Type	Rated control supply voltage U <sub>s</sub>	Version	Order code
Diode - Reverse polarity protection			
CR-P/M 22	6-220 V DC	A1+, A2-	1SVR 405 651 R0000

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 V DC	red, A1+, A2-	1SVR 405 652 R9000
CR-P/M 42CV	110 V DC	green, A1+, A2-	1SVR 405 652 R9100

RC element - Arc elimination

CR-P/M 52B	6-24 V AC/DC		1SVR 405 653 R0000
CR-P/M 52D	24-60 V AC/DC		1SVR 405 653 R4000
CR-P/M 52C	110-230 V AC/DC		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 / 110 V DC	red, for DC: A1+, A2-	1SVR 405 654 R0100
CR-P/M 92V	110-230 V AC / 110 V 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 / 110 V DC	red, for DC: A1+, A2-	1SVR 405 655 R0100
CR-P/M 92CV	110-230 V AC / 110 V 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

## Plug to replace the test button (Packing unit = 100 pieces)

CR-MP			1SVR 405 658 R2000
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## 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

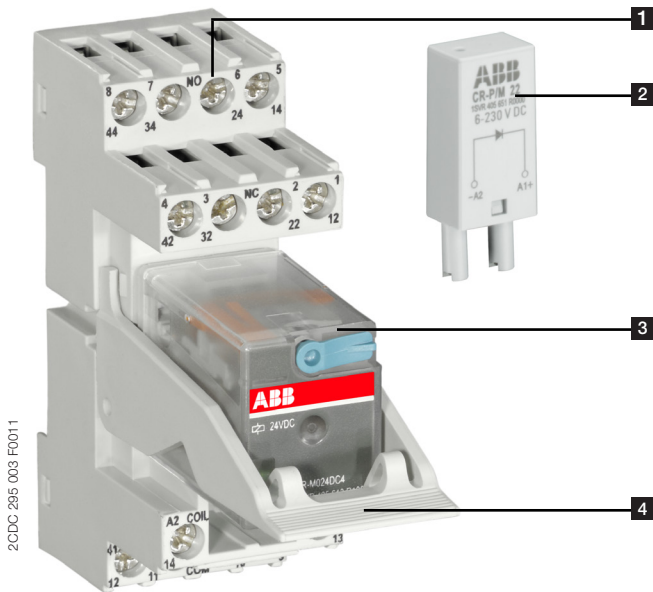
CR-M2SS	for 2 c/o (SPDT) contacts	screw	1SVR 405 651 R1000
CR-M3SS	for 3 c/o (SPDT) contacts	screw	1SVR 405 651 R2000
CR-M4SS	for 2 or 4 c/o (SPDT) contacts	screw	1SVR 405 651 R3000
CR-M2SF	for 2 c/o (SPDT) contacts	fork type screw	1SVR 405 651 R1300
CR-M4SF	for 2 or 4 c/o (SPDT) contacts	fork type screw	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
CR-MM	Marker		1SVR 405 658 R1000

## 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.

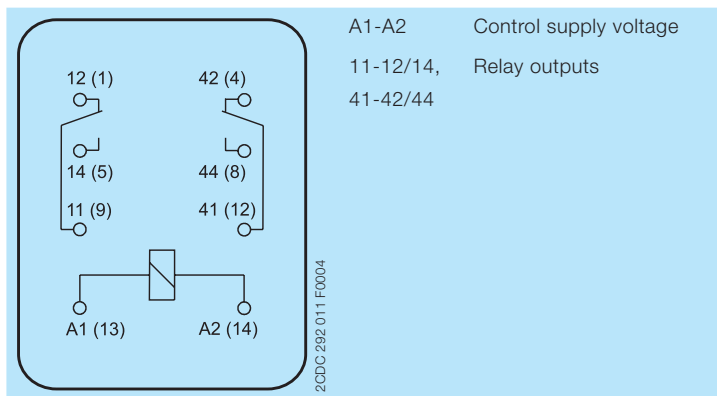
#### Note:

During operation of the relay the test button is warming up. To manually press the test button, first switch off the supply voltage of the relay and wait for a while until the button cools down (or press without delay, using protective gloves or insulated tools).

Press the button smoothly and quickly. As long as the button is pressed the n/o contacts are closed. Releasing the button opens the n/o contacts. A 90 degree rotation of the test button closes the n/o contacts permanently. Reverse rotation of the test button re-opens the n/o contacts.

## Electrical connection

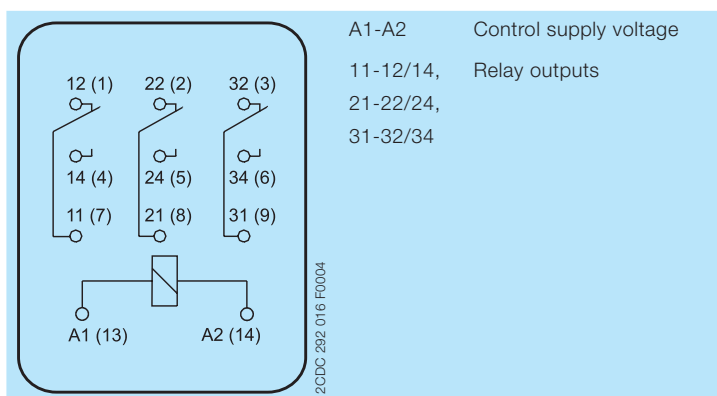
### CR-M with 2 c/o (SPDT) contacts



A1-A2 Control supply voltage  
 11-12/14, 41-42/44 Relay outputs

Connection diagram

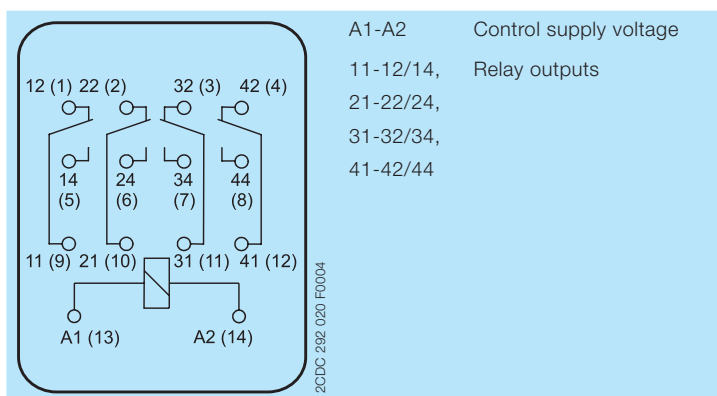
### CR-M with 3 c/o (SPDT) contacts



A1-A2 Control supply voltage  
 11-12/14, 21-22/24, 31-32/34 Relay outputs

Connection diagram

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



A1-A2 Control supply voltage  
 11-12/14, 21-22/24, 31-32/34, 41-42/44 Relay outputs

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) contacts	Relay, 3 c/o (SPDT) contacts	Relay, 4 c/o (SPDT) contacts	
Contact material	AgNi	AgNi	AgNi AgNi/Au 5 $\mu\text{m}$	
Rated operational voltage $U_e$ (IEC/EN 60947-1)	250 V			
Minimum switching voltage	10 V (AgNi), 5 V (AgNi/Au)			
Maximum switching voltage	250 V DC / 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/EN 60947-5-1)	AC-12 (resistive) 230 V	12 A	10 A	6 A
	AC-15 (inductive) 230 V	1.5 A	1.5 A	1 A
	AC-15 (inductive) 120 V	3 A	3 A	1.5 A
	DC-12 (resistive) 24 V	12 A	10 A	6 A
	DC-13 (inductive) 24 V	2.5 A	2.5 A	2 A
	DC-13 (inductive) 120 V	0.22 A	0.22 A	0.22 A
	DC-13 (inductive) 250 V	0.1 A	0.1 A	0.1 A
AC rating * (UL 508; NEMA ICS-5)	Utilization category (pilot duty) (Contact rating code designation)	B300		
	Max. rated operational voltage	300 V AC		
	Max. continuous thermal current at utilization category	5 A		2.5 A
	Max. making / breaking apparent power at utilization category	3600 / 360 VA		1800 / 180 VA
	Utilization category (resistive) (CSA22.2 No.14...)	10 A, 250 V AC 12 A, 150 V AC	6 A, 250 V AC 10 A, 150 V AC	5 A, 250 V AC 10 A, 150 V AC
DC rating * (UL 508; NEMA ICS-5)	Utilization category (pilot duty) (Contact rating code designation)	R300		
	Max. rated operational voltage	300 V DC		
	Max. continuous thermal current at utilization category	1 A		
	Max. making / breaking apparent power at utilization category	28 VA		



Type		CR-M...2	CR-M...3	CR-M...4
Maximum making (inrush) current		24 A	20 A	12 A
Minimum switching power		0.3 W (AgNi), 0.1 W (AgNi/Au)		
Maximum switching (breaking) power	AC1 (resistive)	3000 VA	2500 VA	1500 VA
Contact resistance		≤ 100 mΩ		
Maximum operating frequency	rated load AC1	1200 switching cycles/h		
	without load	18000 switching cycles/h		
Mechanical lifetime		> 2 x 10 <sup>7</sup> switching cycles		
Electrical lifetime	electrical AC1 (resistive)	> 10 <sup>5</sup> switching cycles		
		(12 A, 250 V)	(10 A, 250 V)	(6 A, 250 V)
	cos φ	see Reduction factor F		
Response time		typ. 13 ms (DC), typ. 10 ms (AC)		
Release time		typ. 3 ms (DC), typ. 8 ms (AC)		

\*) Those ratings are based on different type tests but they are not covered by the cULus or CSA approvals

### 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 <sub>imp</sub>	between coil and contacts	2.5 kV		
	between open contacts	1.5 kV		
	between c/o (SPDT) contacts	2.5 kV		≥ 2 kV
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

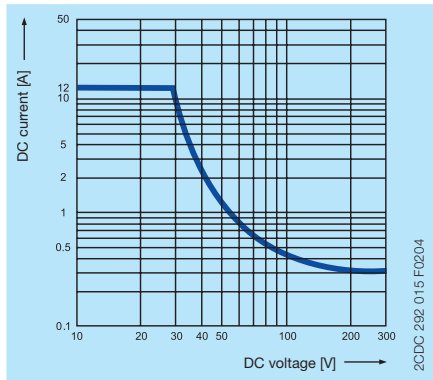
Type		CR-M...2	CR-M...3	CR-M...4
Ambient temperature range	operation	DC: -40...+70 °; AC: -40...+55 °C		
	storage	-40...+85 °C		
Vibration resistance (10-150 Hz)	n/o contact	5 g		
	n/c contact	5 g		
Shock resistance	n/o contact	10 g		
	n/c contact	5 g		

### Standards / Directives

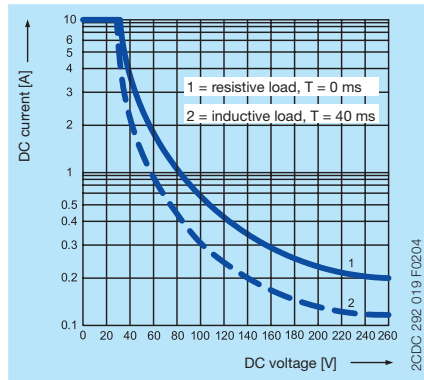
Type		CR-M...2	CR-M...3	CR-M...4
Standards		IEC/EN 61810-1		
Low Voltage Directive		2014/35/EU		
RoHS Directive		2011/65/EU		

## Technical diagrams

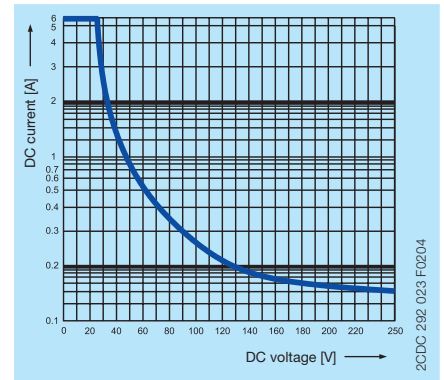
### Load limit curves - Maximum switching power at resistive DC load



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

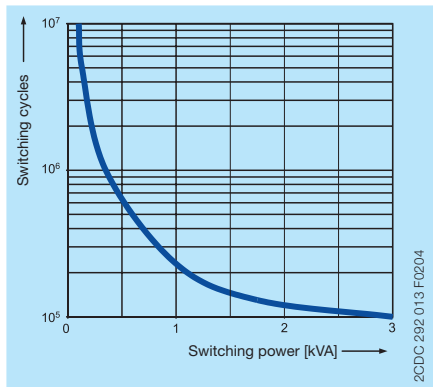


Versions with 3 c/o (SPDT) contacts  
(CR-M ... 3)

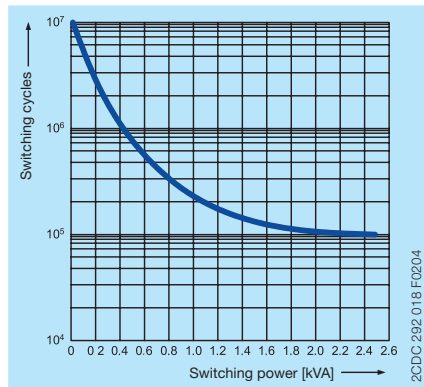


Versions with 4 c/o (SPDT) contacts  
(CR-M ... 4)

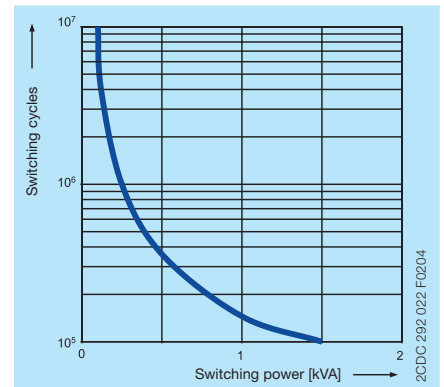
### Load limit curves - Electrical lifetime at resistive AC load



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

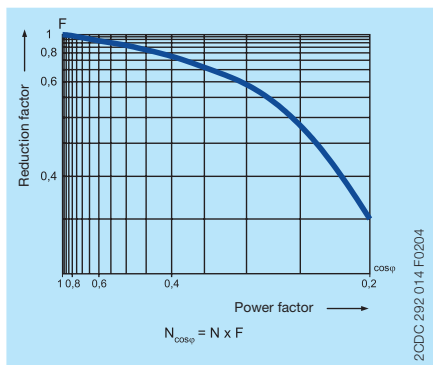


Versions with 3 c/o (SPDT) contacts  
(CR-M ... 3)



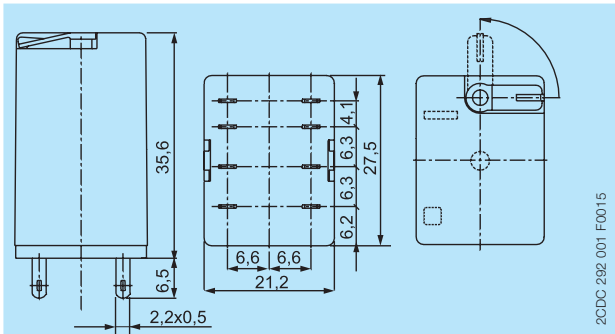
Versions with 4 c/o (SPDT) contacts  
(CR-M ... 4)

### Reduction factor F at inductive AC load

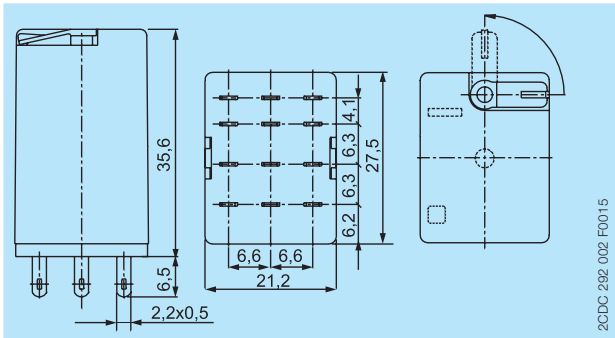


## Dimensions

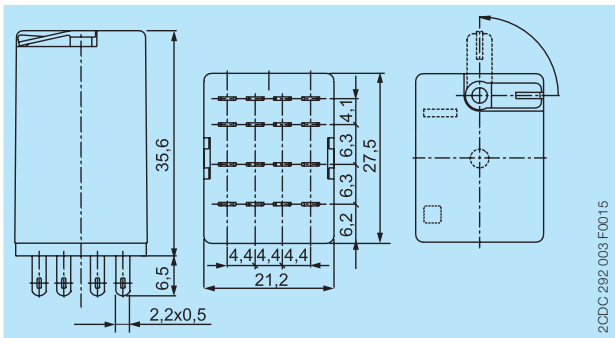
in mm



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 relays and controls	Catalog	2CDC 110 004 C02xx
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)

-> Automation, control and protection -> Electronic relays and controls

-> Interface relays and optocouplers.

## CAD system files

You can find the CAD files for CAD systems at <http://abb-control-products.partcommunity.com>

-> Low Voltage Products & Systems -> Control Products -> Electronic Relays and Controls.

# Contact us

## **ABB STOTZ-KONTAKT GmbH**

P. O. Box 10 16 80  
69006 Heidelberg, Germany  
Phone: +49 (0) 6221 7 01-0  
Fax: +49 (0) 6221 7 01-13 25  
E-mail: info.desto@de.abb.com

You can find the address of your  
local sales organization on the  
ABB home page  
<http://www.abb.com/contacts>  
-> Low Voltage Products and Systems

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