

310 relay - Latching, safety critical, Datasheet

18 contacts



Description

The 310 is a latching relay with 2 stable magnetically latched states. When 1 coil is energized, the relay actuates from magnetically latched position 1 to 2. When the other coil is energized, the relay actuates back from magnetically latched position 2 to 1. Relays have 18 double break contacts (Form X & Y - per customer specification) in all N/O and N/C combinations.

The plug-in design offers secure locking feature for maximum ease of maintenance (no wires need to be disconnected or other hardware removed for relay inspection or replacement). The resistance to impact and vibration is conform to standards in force for Railway Transported Equipment.

Positive mechanical keying of relay to socket is built into relay and socket during manufacture and terminal identifications are clearly marked on identification plate that is permanently attached to the relay. Weld no transfer safety contacts are standard. If one N/O contact welds, no N/C contact can close and visa versa. All relays are factory tested to insure they meet this important safety requirement.

Application

The 310 latching relay allows the memory of the state of the circuit in case of power interruption. Optional gold contact are possible for dry circuit applications or silver and gold contacts combined for mixed load applications.

Features

- Latching relay using 2 separate coils and magnetic rocker mechanism
- Plug-in design with secure locking feature for maximum ease of maintenance
- 18 double break contacts in all N/O and N/C combinations
- Weld no transfer safety contacts standard
- Optional gold contacts
- Optional gold and silver contacts
- Contact life (mechanical) of 100 million cycles
- -40 °C...+80 °C operating temperature

Benefits

- Proven reliable
- Long life cycle
- Easy to maintain and replace
- Low life cycle cost
- No maintenance

Railway compliancy

- NF F 62-002 Rolling stock - Instantaneous relays contacts and sockets
- NF F16-101/102 Fire behaviour - Railway rolling stock
- Relay has been approved to go on the English/French train channel shuttle



310 relay

Technical specifications



Functional and connection diagrams

Timing diagram	Relay pin correspondence																																																						
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr><td>a</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>b</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>c</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>d</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>e</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>f</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>g</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>h</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> </tbody> </table> <p style="text-align: center;">Rear view of relay or socket</p> <div style="text-align: center;"> <p>Relay coil shown with Transil</p> </div>		0	1	2	3	4	a	---	---	---	---	---	b	---	---	---	---	---	c	---	---	---	---	---	d	---	---	---	---	---	e	---	---	---	---	---	f	---	---	---	---	---	g	---	---	---	---	---	h	---	---	---	---	---
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Connection diagram	
<p> this coil controls closing of NC contacts and opening of NO contacts. + a0 b0 g0 a1 a2 a3 c0 c1 c2 c3 c4 e0 e1 e2 e3 e4 g1 g2 g3 - b4 + g4 h4 </p> <p style="text-align: center;">Contact arrangement 9 NC and 9 NO</p> <p style="text-align: center;">SCHEMATIC #1</p> <p>Schematic #1 operation: This relay is designed for actuation of the coil with a permanent voltage. Assuming that before any voltage is applied to either coil, all contacts are as shown in above schematic #1, operation is as follows: When power supply is connected to terminals g4-h4 (Coil 2) and a signal is applied, the relay actuates and closes all NO contacts and opens all NC contacts and latches into this new position. A subsequent signal applied to terminals a0-b0 (Coil1) actuates the relay by opening all NO contacts and closing all NC contacts (back to the initial position as shown in above schematic #1) and latches in this position.</p>	<p> this coil controls closing of NC contacts and opening of NO contacts. + a0 - b0 a1 a2 a3 a4 c0 c1 c2 c3 c4 e0 e1 e2 e3 e4 g0 g1 g2 g3 + g4 - h4 </p> <p style="text-align: center;">(shown with optional Transil protection) Contact arrangement 4 NC and 14 NO</p> <p style="text-align: center;">SCHEMATIC #2</p> <p>Schematic #2 operation: To operate this relay, it is recommended that the coil be actuated with a pulse of 200 ms min. duration. Assuming that before any voltage is applied to either coil all contacts are as shown in Schematic #2, operation is as follows: When a signal is applied to terminals g4-h4 (Coil 2), the relay actuates and closes all NO contacts and opens all NC contacts and latches in this new position. A subsequent signal applied to terminals a0-b0 (Coil 1) actuates the relay by opening all NO contacts and closing all NC contacts (back to the initial position as shown in above schematic #2) and latches in this position. Note: a pulse of 200 ms min. duration is required to operate the relay and that only one coil can be energized at a time.</p>



310 relay

Technical specifications

Coil data - DC versions

U _{nom} (VDC)	U _{operating} (VDC)	P _{nom} (W)	R _{coil} (Ω) ⁽¹⁾	L/R (ms) ⁽²⁾
36	25 / 45	5.2	250	25
72	48 / 90	5.2	1000	25
110	77 / 138	5.2	2400	25

(1) Coil resistance tol.: ± 8% at 20 °C

(2) Valid for closed relay.

Contact data - standard (silver contacts)

Nominal current	8 A resistive		
Nominal breaking capacity and life	2.4 A at 72 VDC	L/R : 0 ms	Electrical life: 5 x 10 ⁶
Contact closure pick-up time	< 60 ms		
Contact opening drop-out time	< 60 ms		
Minimum contact continuity	20 mA at 24 VDC		
Number of contacts	18 double break contacts (form X & Y)		
Contact material	Hard silver overlay laminated to copper		
Contact resistance	initial	10 mΩ max at 8 A	
	end of life	40 mΩ max at 8 A	

Contact data - dry circuit application (gold contacts)

Contact design	Stationary contacts	Bifurcated 2 contact finger design with wiping action to assure lowest contact resistance and endurance
	Movable contacts	Solid blade
Contact resistance	≤ 20 mΩ at 5 A (carry only)	
Maximum contact ratings	Operating	20 mA maximum at 72 VDC
	Carry only (no make and break)	5 mA maximum at 5 VDC
Minimum current ratings	5 mA at 12 VDC*	
Contact material	Stationary contacts	Solid hard gold or gold plated over hard silver
	Moveable contacts	Hard gold over hard silver overlay laminated to copper

* For gold bifurcated contact: minimum current rating is 1 mA - 5 VDC



310 relay

Technical specifications

Electrical characteristics

Dielectric strength	EN 50155 - 2200 VAC, 1 min
Insulation resistance	≥ 1000 MΩ at 500 VDC

Mechanical & environmental characteristics

Vibration	NF F 62-002 The tests are conducted in the X, Y, Z planes at frequency between 5 & 50 cycles (sinusoidal) at 1 g
Shock	NF F 62-002 Tests are applied in both directions in the X, Y & Z planes. Then successive shocks are administered consisting of the positive component of sinusoidal with a value of 15 g, 11 ms Other vibration and shock tests can be performed on request.
Mechanical life	> 100 x 10 ⁶ operations
Weight	639 g (22.5 ounces)
Temperature	-40 °C...+80 °C
Humidity	93% RH, 40° C for 4 days
Salt mist	5% NaCl, 35° C for 4 days
Protection	IP40 (relay on socket)
Fire & smoke	Materials: Polycarbonate resin (cover) / polyester (base) Note: These materials have been tested for fire propagation and smoke emission according standards NF F 16-101, NF F 16-102. And have been approved for use on the English/French train channel shuttle.

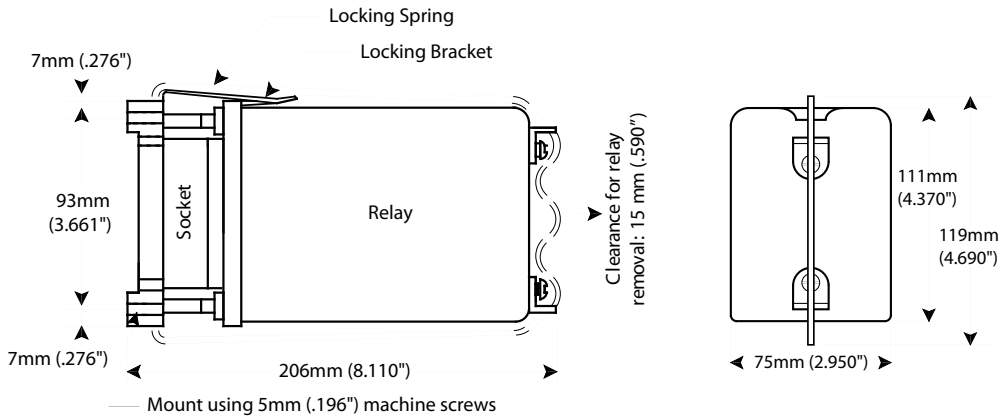


310 relay

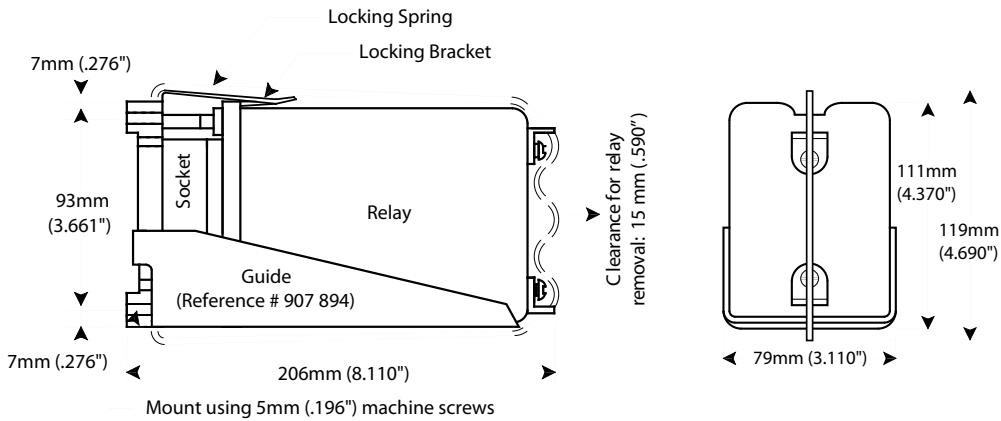
Technical specifications

Dimensions (mm)

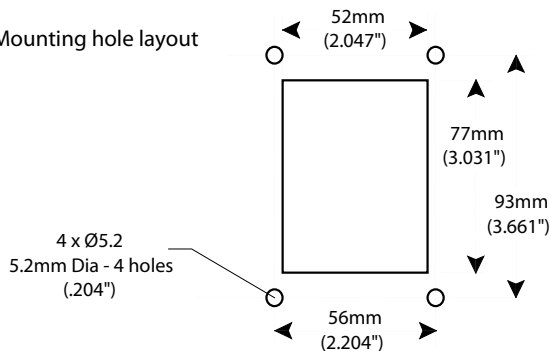
Relay shown with Socket assembly no. 153913 TYPE COR NK 58D (or 160 967 TYPE COR SA).
Included is socket with locking bracket and locking spring.



Relay shown with Socket assembly no. 907983 TYPE COR PA 58D.
Included is socket with guide plate, locking bracket and locking spring. The guide plate aligns the relay with the socket for easy plugging in when the socket is not readily accessible.



Mounting hole layout



Important note: Each relay and socket is uniquely keyed to prevent accidental insertion of the wrong relay into a socket. This safety feature assures that only the relay specified for the circuit will be accepted by the socket. The keying system employs 2, 3 or 4 pins positioned correspondingly in the relay base and the socket to assure that only the correct relay and socket will mate.



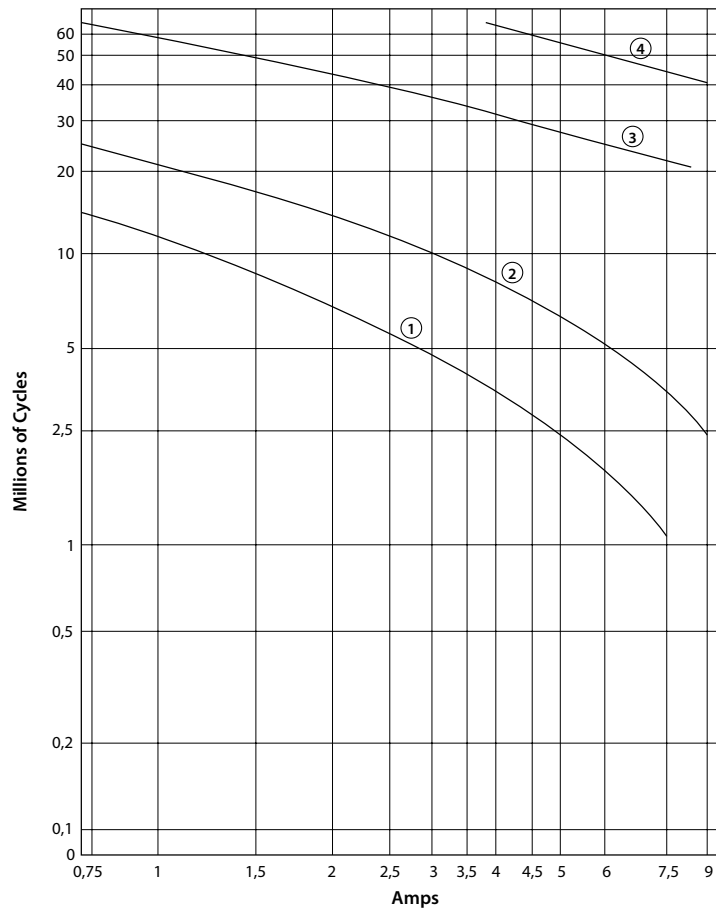
310 relay

Technical specifications

Dynamic relay selection curve No 1

AC Current breaking capacity versus life expectancy in millions of cycles.
Rate of contacts opening and closing = 1200 operations per hour.
Curves shown for resistive load (Power Factor = 1).

Curve	1	2	3	4
VAC	220	125	48	24



310 relay

Technical specifications

Dynamic relay selection curve No 2

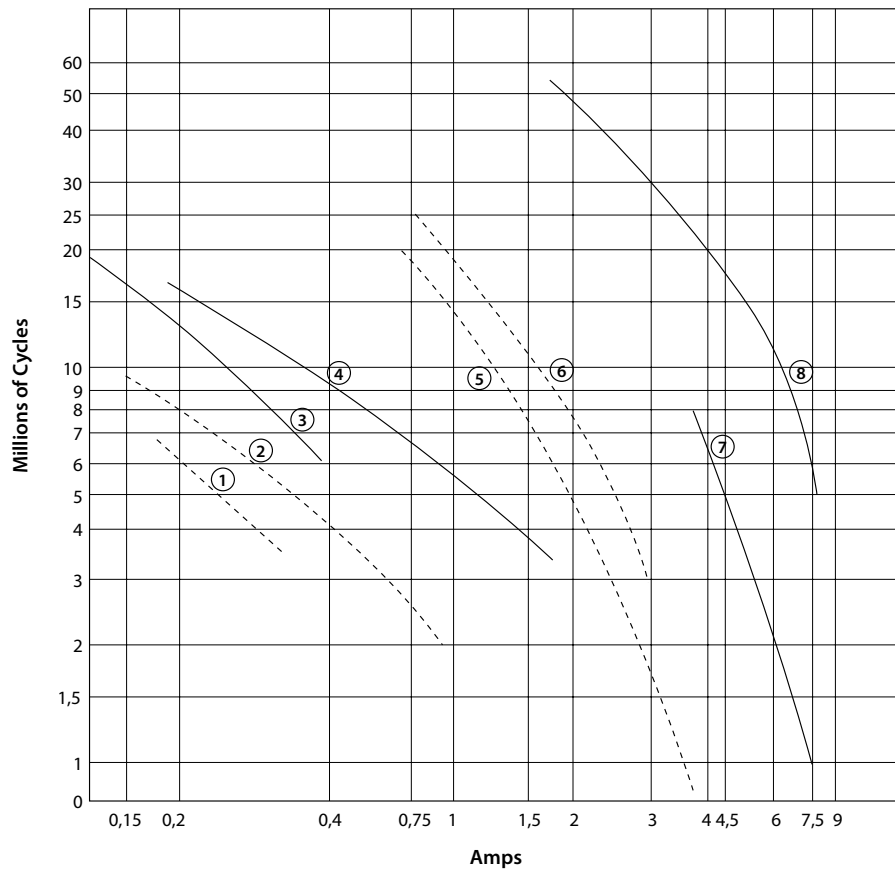
DC Current breaking capacity versus life expectancy in millions of cycles.

Rate of contacts opening and closing = 1200 operations per hour.

Curves shown for inductive load:

- L/R= 20 ms continuous current
- - - - L/R= 40 ms continuous current

Curves	1-3	2-4	5-7	6-8
VDC	220	125	48	24



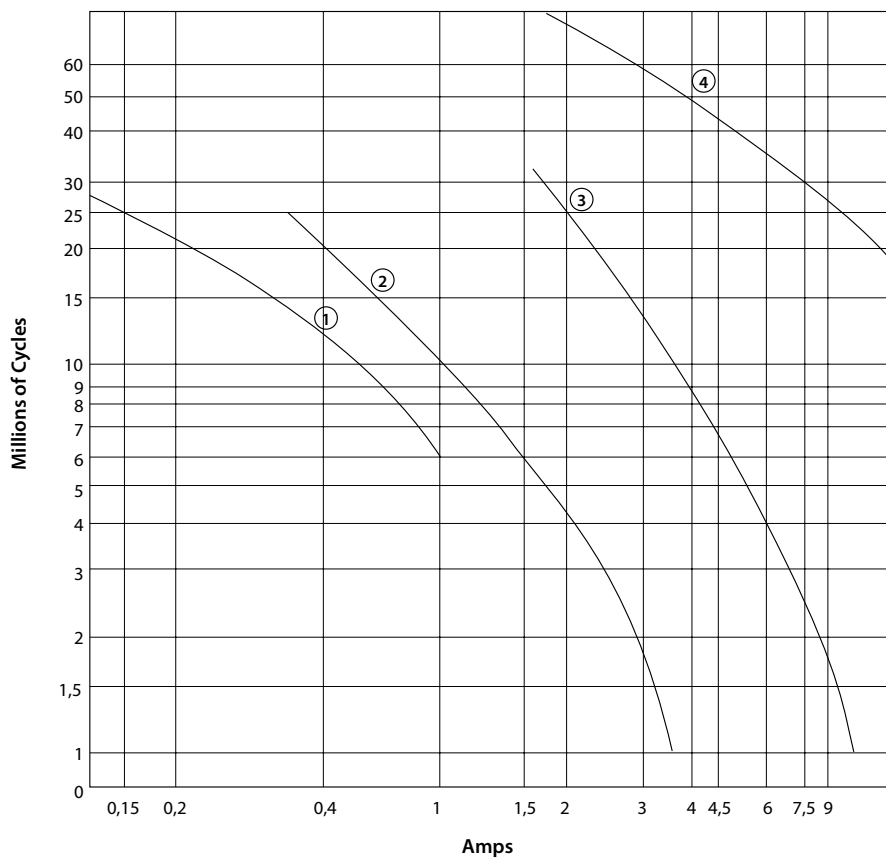
310 relay

Technical specifications

Dynamic relay selection curve No 3

DC Current breaking capacity versus life expectancy in millions of cycles.
 Rate of contacts opening and closing = 1200 operations per hour.
 Curves shown for resistive load (L/R = 0). Continuous current.

Curve	1	2	3	4
VDC	220	125	48	24



310 relay

Technical specifications

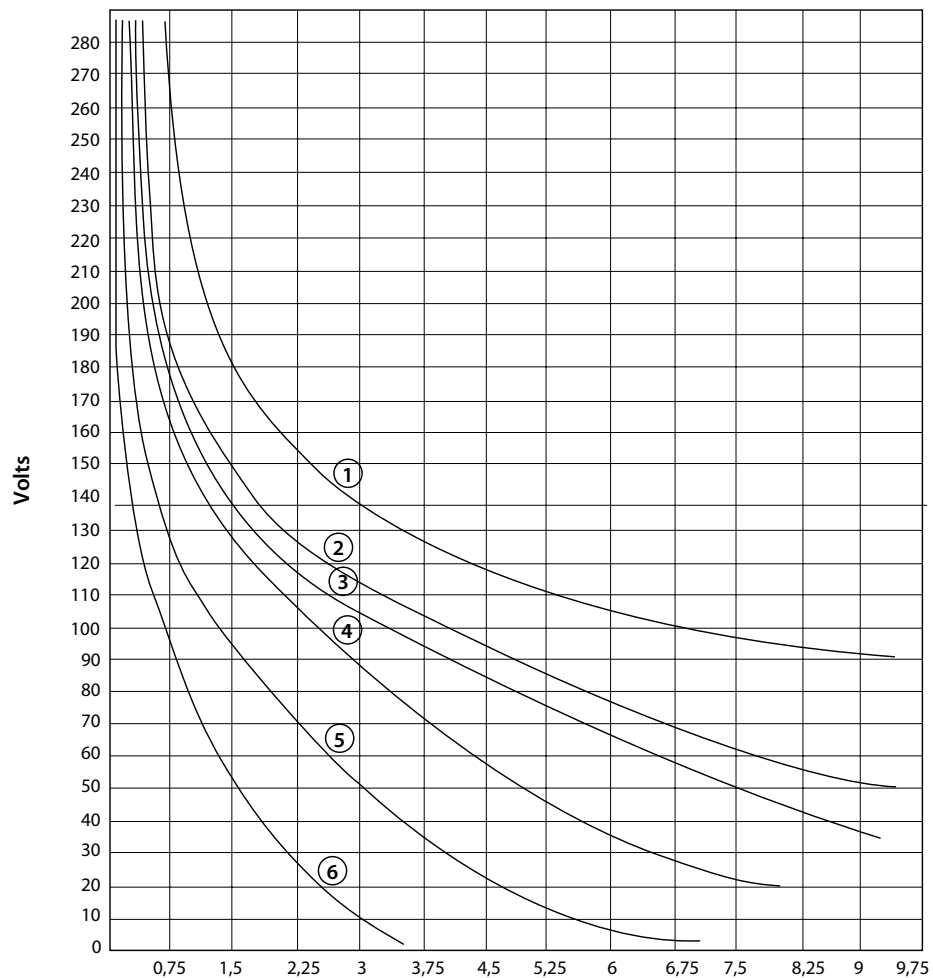
Dynamic relay selection curve No 4

Maximum contact breaking capacity versus voltage for a given L/R.

Rate of contacts opening and closing = 600 operations per hour.

Curves shown for resistive load (L/R=0) and inductive loads. Continuous current.

Curve	1	2	3	4	5	6
L/R=	0ms	15ms	20ms	40ms	60ms	100ms



310 relay

Technical specifications

Dynamic relay selection curve No 5

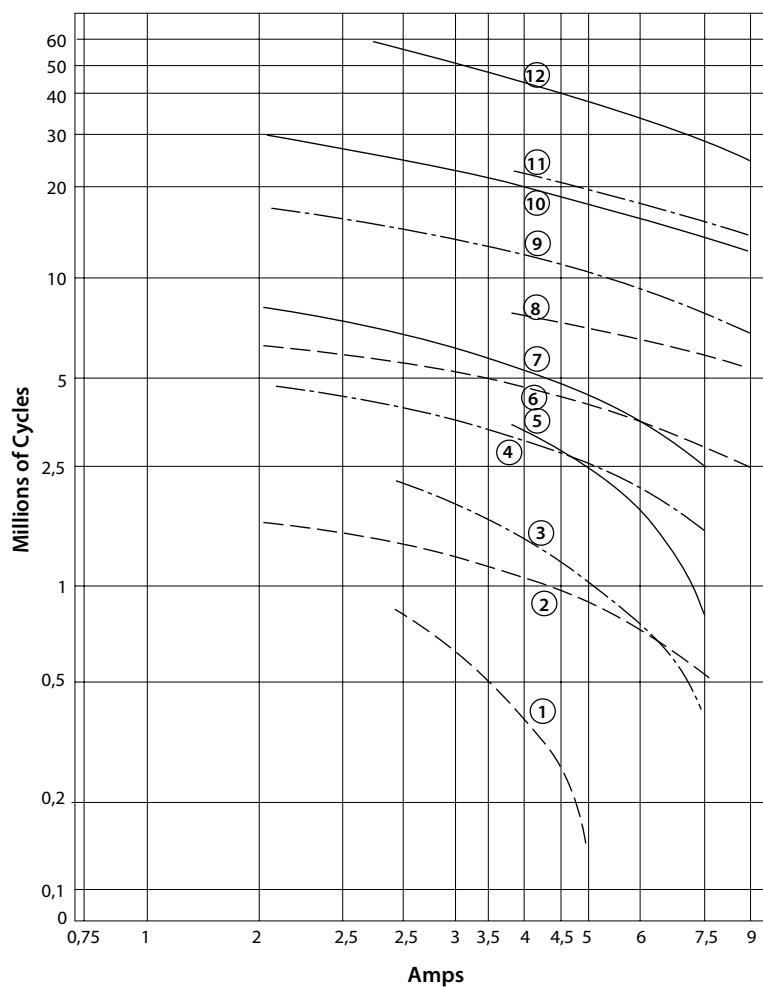
AC Current breaking capacity versus life expectancy in millions of cycles.

Rate of contacts opening and closing = 1200 operations per hour.

Values shown for inductive loads:

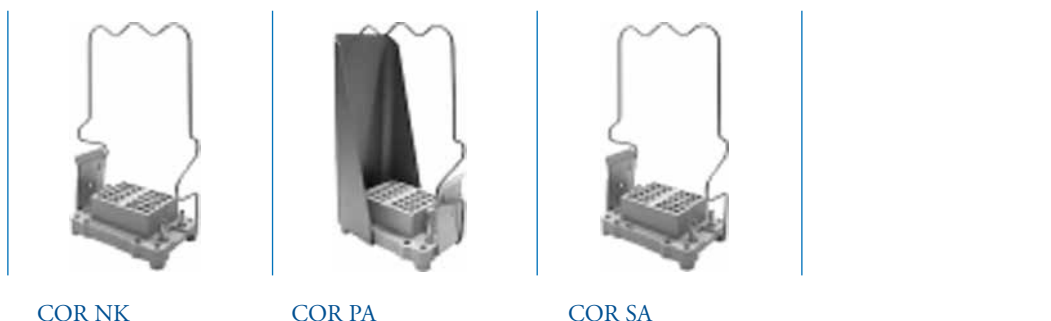
- Cos ϕ = 0.7
- - - Cos ϕ = 0.5
- - - - Cos ϕ = 0.3

Curves	1,3 &4	2,5 &7	6,9 &10	8,11 &12
VAC	220	125	48	24



310 relay

Mounting possibilities / sockets



Panel/flush mounting

153913	COR NK X*	Socket without guide - Polyester melamine (use with standard relay 310)
907983	COR PA X*	Socket with guide - Polyester melamine (use with standard relay 310)
160967	COR SA	Socket without guide - Polyester melamine (use with relay 303S)

* X keying code set up by factory



310 relay

Instructions

Installation

Install socket and connect wiring correctly according identification to terminals. Plug relay into socket. Reverse installation into socket not possible due to mechanical blocking by snap-lock.

Don't reverse polarity of coil connection.

Relays can be mounted (tightly) next to each other and in any attitude. However, we recommend the following:

- If the relay is mounted **vertical**; the direction of contact closure should be oriented transverse to the direction of forward motion.
- If the relay is mounted **horizontal**; the direction of contact closure should be oriented so that gravity will cause the contacts to revert to their de-energised position.

Warning! Never use silicon near by relays

Operation

Before operating always apply voltage to coil to check correct operation.

Long term storage may corrode the silver on the relay pins. Just by plugging the relay into the socket, the female bifurcated receivers will automatically clean the corrosion on the pins and guarantee a good connection.

Do not use the relay in places with flammable gas as the arc generated from switching could ignite gasses.

Maintenance

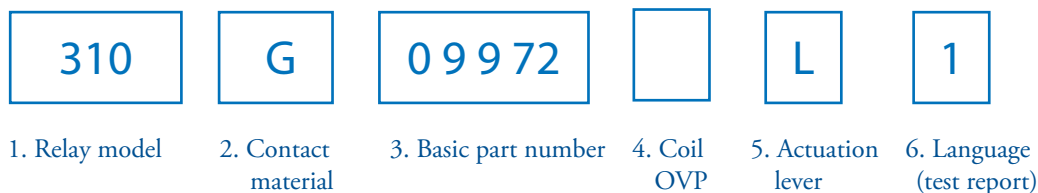
Correct operation of relay can easily be checked as transparent cover gives good visibility on the moving contacts. When the relay doesn't seem to operate correct, please check presence of coil voltage. Use a multimeter. If LED is used, coil presence should be indicated. If coil voltage is present, but the relay doesn't work, a short circuit of suppression diode is possible (The coil connection was reversed). If relay doesn't work after inspection, please replace relay unit by a similar model. Send defective relay back to manufacturer. Normal wear and tear excluded.



310 relay

Ordering scheme

Configuration:



This example represents a **310 G 0 9 9 72 L 1**

Description: 310 relay, contact material: gold, configuration 9 N/C + 9 N/O with Unom 72 VDC, actuation lever and test report in English

1. Relay model

310

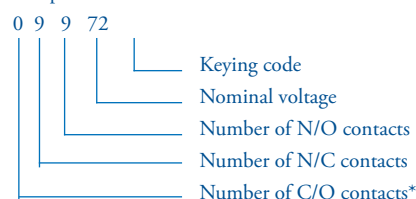
2. Contact material

-	Silver contacts
G	Gold contacts*
M	Gold bifurcated and silver contacts *
* special orders only	

3. Basic part number

0 3 13 36	3 N/C + 13 N/O - 36 VDC schem. #1
0 8 8 72	8 N/C + 8 N/O - 72 VDC schem. #1
0 8 8 110	8 N/C + 8 N/O - 110 VDC schem. #1
0 4 14 36	4 N/C + 14 N/O - 36 VDC schem. #2
0 9 9 72	9 N/C + 9 N/O - 72 VDC schem. #2
0 9 9 110	9 N/C + 9 N/O - 110 VDC schem. #3

Description



*on industrial version request

4. Coil overvoltage protection

-	No coil protection
S	Transil coil protection

5. Manual actuation level

L	Built-in lever to actuate relay manually
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6. Language on test report

-	French
1	English
2	Spanish





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