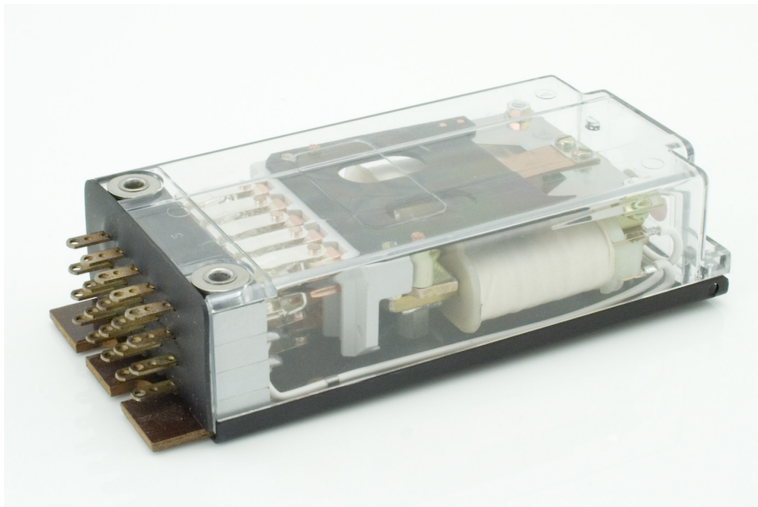


CM relay - 7 contacts + 2 gold contacts

Datasheet



Description

The CM relay is designed for combined power & dry circuit applications in diesel locomotives.

Part number CM 045 72 37 S M is rated for 72 VDC nominal voltage and is configured with 4 N/C and 5 N/O double break contacts. Two of them (1 N/C & 1 N/O) are gold bifurcated contacts (dry circuit). All other contacts are in silver.

On specific request, to provide for the large voltage drop that occurs during start-up of a diesel engine, the non-dropout voltage can be adjusted to a low value of 24 VDC for a 72 VDC nominal coil voltage

The CM relays is pluggable in the COR NJ socket.

Application

The CM relay is designed for both power levels and low level signals are being switched for general purpose heavy duty applications such as lighting, pumps and fans, as standard Weld no transfer design for safety critical applications such as door control, emergency brake failure, interlocking traction and breaking with a gold bifurcated contact for dry circuit signal information

Features

- Instantaneous relay
- For combined power & dry circuit applications in diesel locomotives
- 4 N/C + 5 N/O double break contacts with 1 N/C & 1 N/O gold bifurcated contact and all other contact in silver
- Weld no transfer safety contacts standard on silver contacts
- Contact life (mechanical) of 100 million cycles
- -40 °C...+80 °C operating temperature

Benefits

- Proven reliable in heavy duty application
- Space Saving package size
- Long life cycle cost
- Easy to maintain and replace
- Used in safety critical application
- Low life cycle cost

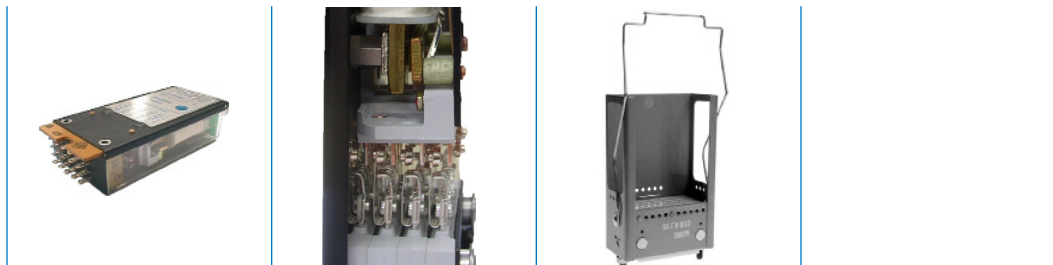
Railway compliancy

- NFF 62-002 Rolling stock - Instantaneous relays contacts and sockets
- NF F16-101/102 Fire behaviour - Railway rolling stock



CM relay

Technical specifications



Functional and connection diagrams

Timing diagram	Relay pin correspondence																														
	<p>Keying Plate</p> <table border="1"> <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> </tbody> </table> <p>Relay pin correspondence (rear view of relay shown)</p>		0	1	2	3	4	A	—	—	—	—	—	B	—	—	—	—	—	C	—	—	—	—	—	D	—	—	—	—	—
	0	1	2	3	4																										
A	—	—	—	—	—																										
B	—	—	—	—	—																										
C	—	—	—	—	—																										
D	—	—	—	—	—																										

Connection diagram

A4, B4 Gold
C4, D4 Gold
All other contacts Silver

4 NC contacts- 5 NO contacts



CM Relay

Technical specifications

Coil data

U _{nom}	U _{operating} (VDC)	P _{nom} (W)	U _{hold} (VDC)	U _{drop-out} (VDC)	R coil (Ω) ⁽¹⁾	L/R (ms) ⁽²⁾
72 VDC	48 / 90	5.2	24	6.5	1000	25

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

(2) Valid for closed relay.

Contact data - standard version (silver contacts)

Nominal current	8 A resistive		
Nominal breaking capacity and life	2.4 A at 72 VDC	L/R : 0 ms	Electrical life: 5x10 ⁶ op.
	0.8 A at 72 VDC	L/R: 30 ms	Electrical life: 2x10 ⁶ op.
	2.4 A at 220 VAC 50 Hz	cosØ=1	Electrical life: 2.5x10 ⁶ op.
	Lamp filament circuit: 160 W at 72 VDC		Electrical life: 5x10 ⁵ op.
Contact overload withstand	At 24 VDC: 160 A at L/R = 0 for 10 ms (10 operations at the rate of 1 operation per minute)		
Contact closure time	Pick-up time N/O < 45 ms	Drop-out* time N/C < 35ms	
Contact opening time	Pick-up time N/C < 30 ms	Drop-out* time N/O < 8ms	
Minimum contact continuity	20 mA at 24 VDC		
Number of contacts	9 double make / double break contacts (form X&Y)		
Contact material	Hard silver overlay laminated to copper		
Contact resistance – initial	10 mΩ max at 5 A		
Contact resistance – end of life	40 mΩ max at 5 A		

* With P option less than 70 ms

Contact data – Gold bifurcated contact

Contact configuration (1 C/O double break contact)	Stationary contacts	Bifurcated 2 contact finger design
	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	1 mA at 5 VDC	
Electrical life	2 x 10 ⁶ operations	
Contact material	Stationary contacts	Solid gold alloy
	Movable contacts	Gold over hard silver overlay laminated to copper



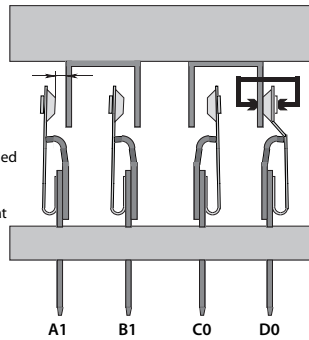
CM relay

Technical specifications

Contact design

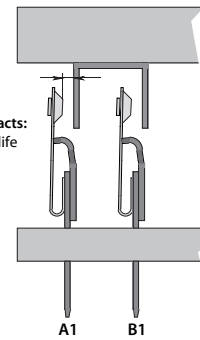
Weld no transfer function:

If one NO contact welds, no NC contact can close (and visa versa) and cause an overlapping of functions. All relays are factory tested to insure they meet this important safety requirement. 150% of max. operating voltage is applied to the relay while holding 1 NC contact closed by mechanical means. Under these conditions, it is verified that no NO contact makes.



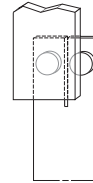
Double break contacts:

Extend the contact life on highly inductive DC currents.



Bifurcated contact:

2 contact finger design (contacts are in parallel) with wiping action to assure both lowest contact resistance and endurance



CM relay

Technical specifications

Electrical characteristics

Dielectric strength	2200 VAC, 1 min between contacts 2600 VAC, 1 min between contacts, coil and frame
Insulation resistance	≥ 1000 MΩ at 500 VDC

Environmental characteristics

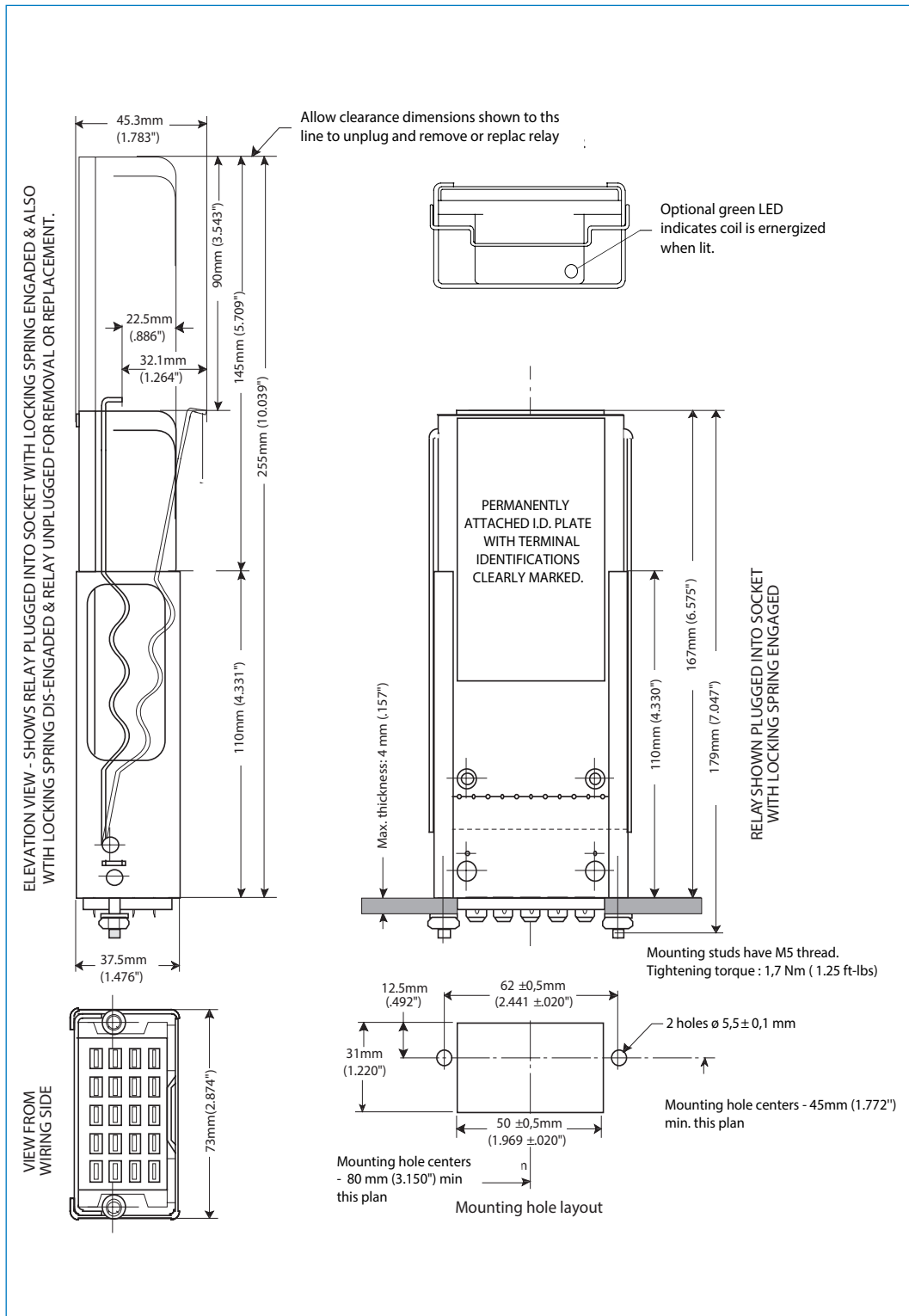
Vibration	NF F 62-002 The tests are conducted in the X, Y, Z planes at frequency between 10 & 50 cycles (sinusoidal) at 2 g
Shock	NF F62-002 Tests are applied in both directions in the X, Y & Z planes. Then successive shocks are administered consisting of the positive component of sinusoidal with a value of 30 g, 18 ms Other vibration and shock tests can be performed on request
Mechanical life	> 100 x 10 ⁶ operations
Weight	400 g (14.1 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: Makrolon polycarbonate (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.



CM relay

Technical specifications

Dimensions (mm)



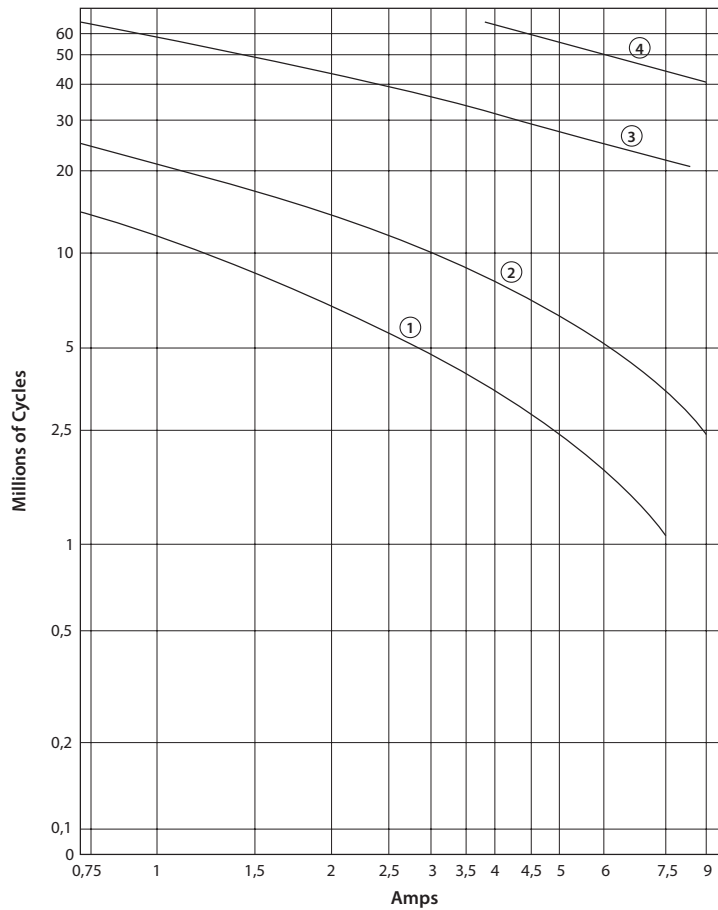
CM relay

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



(for silver contacts)



CM relay

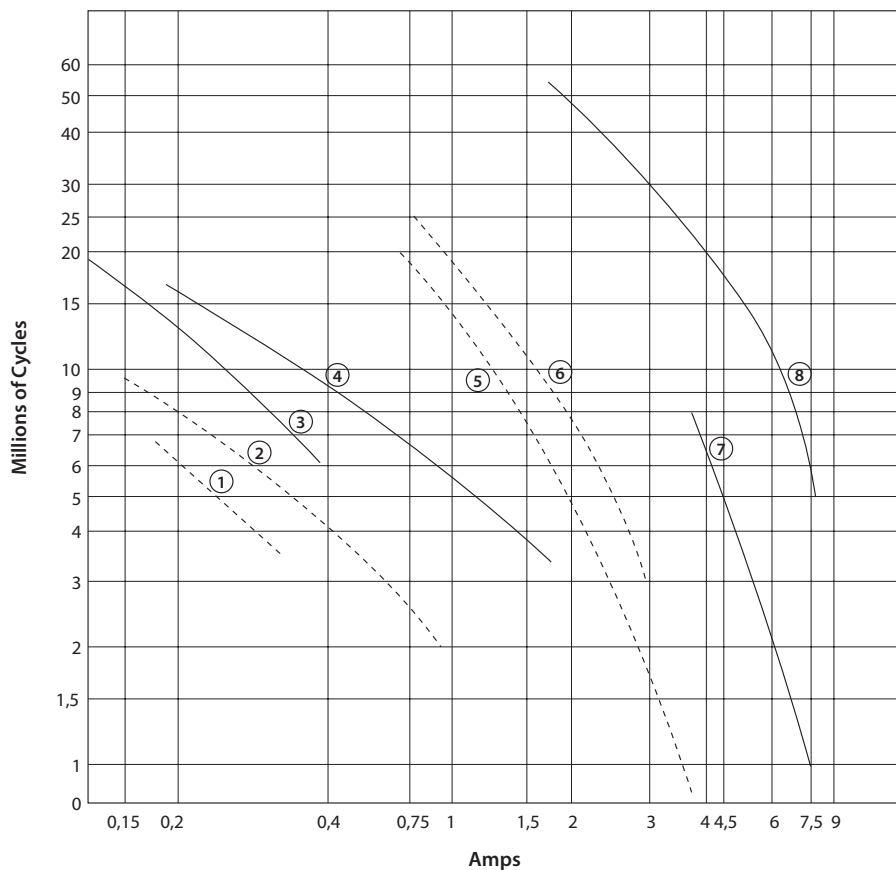
Technical specifications

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



(for silver contacts)



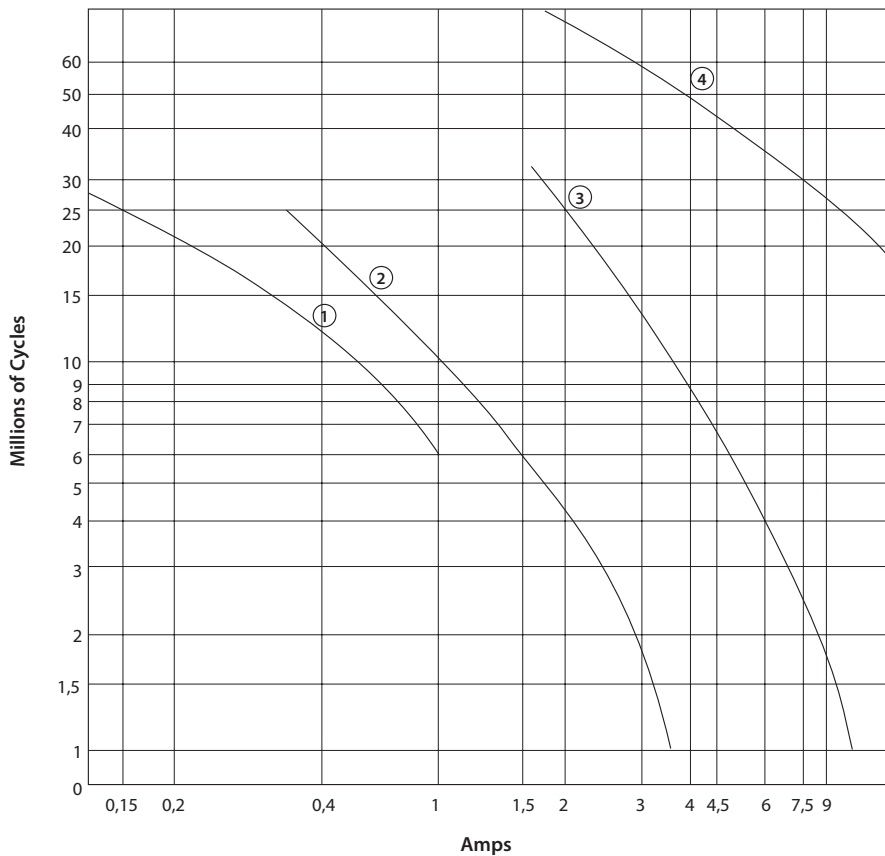
CM relay

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



(for silver contacts)



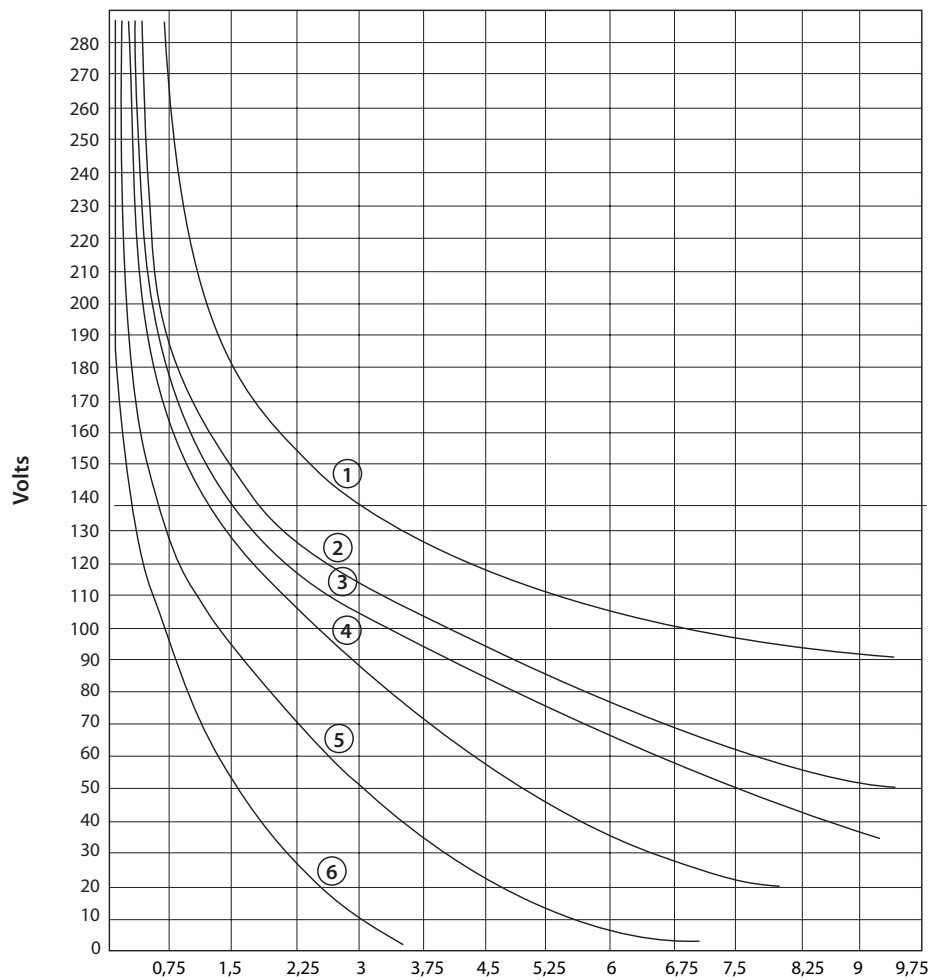
CM relay

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



(for silver contacts)



CM relay

Technical specifications

Dynamic relay selection curve No 5

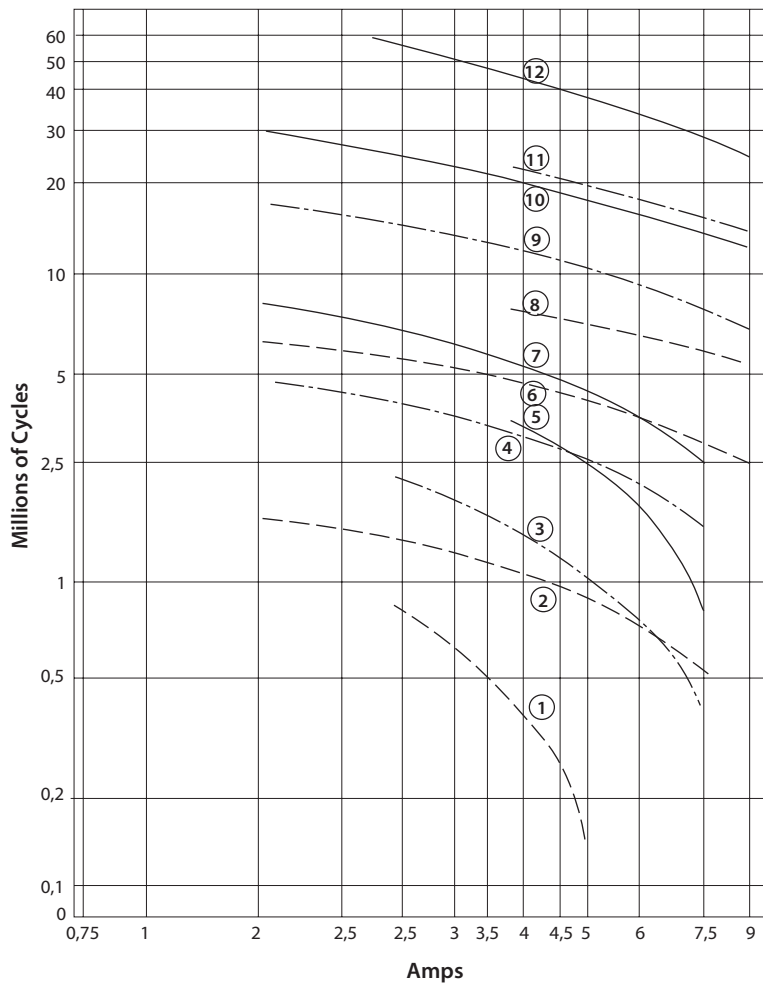
AC Current breaking capacity versus life expectancy in millions of cycles.

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

Values shown for inductive loads:

- $\text{Cos } \varnothing = 0.7$
- - - - $\text{Cos } \varnothing = 0.5$
- - - - $\text{Cos } \varnothing = 0.3$

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



(for silver contacts)



CM relay

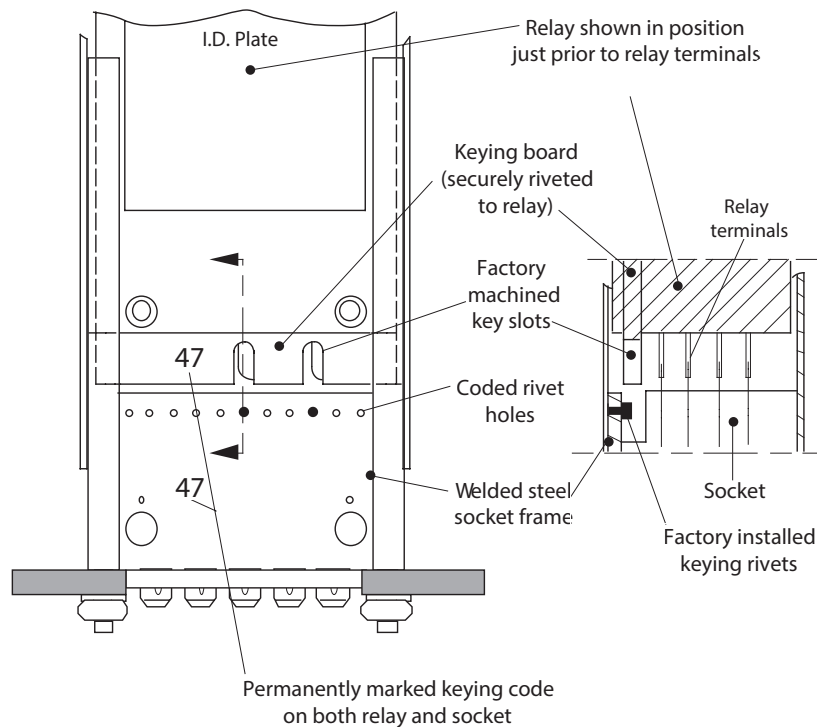
Mechanical keying

Mechanical keying of the relay to the socket is accomplished during manufacturing.

Keying slots are located by their keying code numbers on the relayboard. Keying rivets are located in the steel socket frame in the correct (and corresponding) coded rivetholes to match with the relay.

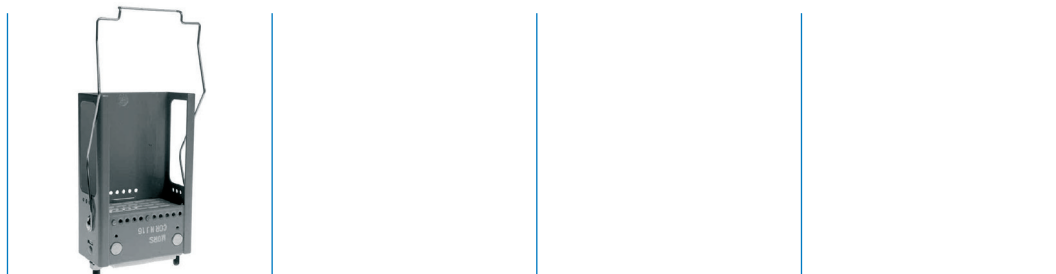
Once keying has been completed during manufacturing, it is permanent and cannot be changed. This is intentional in the design to ensure that only the correct relay can be plugged into the socket.

The keying is completed by a color code on the top of the relaycover and on the side of the socket for better identification on the train.



CM relay

Mounting possibilities



COR NJ

Panel mounting

926913	COR NJ 37	Socket (Alkyde compound) with locking spring
--------	-----------	--



CM 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.

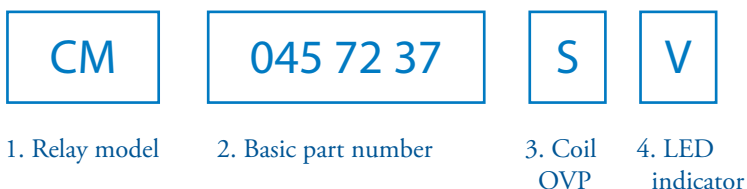
Maintenance

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.



CM relay

Ordering scheme



This example represents a **CM 045 72 37 S V**.

Description: CM series relay, contact configuration 4 N/C + 5 N/O, Unom 72 VDC, keying 37, transil coil protection, LED indicator

1. Relay model

CM

2. Relay basic part number*

045 72 73 4 N/C + 5 N/O 72 VDC

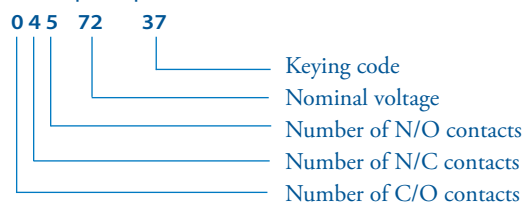
3. Coil overvoltage protection

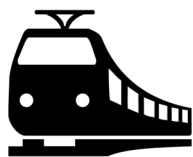
-	No coil protection
P	Avalanche diode coil protection
S	Transil coil protection

4. LED coil voltage indicator

-	No LED
V	LED voltage indicator

* Description part number





www.morssmitt.com



Mors Smitt France SAS

Tour Rosny 2, Avenue du Général de Gaulle,
F - 93118 Rosny-sous-Bois Cedex, FRANCE
T +33 (0)1 4812 1440, F +33 (0)1 4855 9001
E sales.msf@wabtec.com

Mors Smitt Asia Ltd.

29/E, Fun Towers, 35 Hung To Road
Kwun Tong, Kowloon, HONG KONG SAR
T +852 2343 5555, F +852 2343 6555
E sales.msa@wabtec.com

Mors Smitt B.V.

Vrieslantlaan 6, 3526 AA Utrecht,
NETHERLANDS
T +31 (0)30 288 1311, F +31 (0)30 289 8816
E sales.msby@wabtec.com

Mors Smitt Technologies Inc.

1010 Johnson Drive,
Buffalo Grove, IL 60089-6918, USA
T +1 847 777 6497, F +1 847 520 2222
E salesmst@wabtec.com

Mors Smitt UK Ltd.

Graycar Business Park, Barton under Needwood,
Burton on Trent, Staffordshire, DE13 8EN, UK
T +44 (0)1283 722650 F +44 (0)1283 722651
E sales.msuk@wabtec.com

RMS Mors Smitt

6 Anzed Court, Mulgrave,
VIC 3170, AUSTRALIA
T +61 (0)3 8544 1200 F +61 (0)3 8544 1201
E sales.rms@wabtec.com