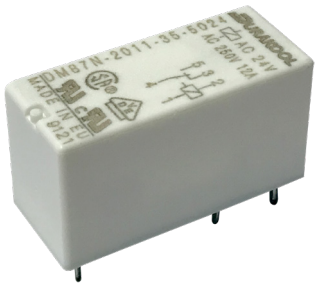
DM87 Series
PCB Power Relay



- Cadmium - free contacts
- 5000 V / 10mm Reinforced insulation
- For PCB and plug-in sockets
- Accessories: sockets and modules
- AC and DC coils
- Complies with EN 60335-1
- Recyclable packing

E305753 RoHS Compliant

Contacts

Contact arrangement		1C/O, 1NO
Contact material		AgNi, AgNi/Au 5 um, $AgSnO_2$
Rated max. switching voltage	AC	250V / 400V
Min. switching voltage		5V AgNi, 5V AgNi/Au 5 um, 10V $AgSnO_2$
Rated load	AC	12A / 250VAC
	DC	12A / 24VDC
Min. switching current		5mA AgNi, 2mA AgNi/Au 5um, 10mA $AgSnO_2$
Max. inrush current		25A $AgSnO_2$
Rated current		12A
Max. breaking capacity	AC1	3000VA
Min. breaking capacity		0.3W AgNi, 0.05W AgNi/Au 5 um, 1W $AgSnO_2$
Initial resistance		≤100mΩ
Max. operating frequency	at rated load	AC1 600 cycles/hour
	no load	72,000 cycles/hour

Coil

Rated voltage	AC/DC	12...240VAC 50/60Hz, 3...110VDC
Must release voltage	AC/DC	AC ≥ 0.15Un, DC ≥ 0.1Un
Operating range		See tables 1, 2 and figures 4 & 5
Rated power consumption	AC/DC	0.75VA, DC: 0.4...0.48W

Insulation EN60664-1

Insulation category		C250 / B400
Insulation rated voltage		400 VAC
Rated surge voltage		4,000 VAC
Overvoltage category		III IEC 61810-5 (PN-IEC 664-1)
Insulation pollution degree		3
Dielectric strength	coil to contact	5,000VAC
	contact to contact	1,000 VAC
Contact - coil distance	clearance & creepage	≥ 10mm

General Data

Operating / Release time	typ.	7ms / 3ms
Electrical life	Resistive AC1	> 1 x 10^5 12A, 250VAC
	cosφ	See figure 7
	DC L/R=40 ms	> 10^5 0.15 A, 220VDC
Mechanical life	ops.	> 3 x 10^7

Environmental

Environmental protection		RTIII IEC 61810-7
Cover protection		IP40 or IP67
Solder bath temperature / time	max.	270°C / 5s
Ambient temperature	operating	AC -40 to +70°C, DC -40 to +85°C
	storage	-40 to +85°C
Shock resistance		30g
Vibration resistance	(NO/NC)	10g 10...150 Hz
Dimensions	L x W x H	29 x 12.7 x 15.7mm
Weight	approx.	14g

Ordering Code

D M 8 7 N - 2 0 1 1 - 3 5 - 5 0 2 4

Series

PCB Layout
N: 3.5mm
L: 5.0mm left
P: 5.0mm right

Contact material
20: AgNi
23: AgNi/Au 5m
30: $AgSnO_2$

Contact arrangement
11: 1C/O
21: 1NO

Environmental protection
2: In cover, IP40
3: In cover, IP67 (waterproof)

Mounting & terminations
5: For PCB and sockets

Coil code:
See table 1 & 2

Minimum order quantities may apply for some combinations.

Notes:
For AC loads this relay is designed for 50-60Hz standard industrial power and was tested according to AC1 category as defined by the IEC 60947-1 standard, covering low-frequency switchgear (typically 50-60 Hz).
Operating at higher frequencies, places the component outside its certified utilisation category, invalidating all safety certifications (CE, UL, etc.) and manufacturer performance guarantees.

DC Coil Data — Table 1

Coil code	Rated voltage (VDC)	Coil resistance Ω ±10% (at 20°C)	Coil operating voltage range (VDC@ 20°C)	
			min.	max.
1003	3	22	2.1	7.6
1005	5	60	3.5	12.7
1006	6	90	4.2	15.3
1009	9	200	6.3	22.9
1012	12	360	8.4	30.6
1018	18	710	12.6	45.9
1024	**24**	**1440**	**16.8**	**61.2**
1036	36	3140	25.2	91.8
1048	48	5700	33.6	122.4
1060	60	7500	42.0	153.0
1110	110	25200	77.0	280.0

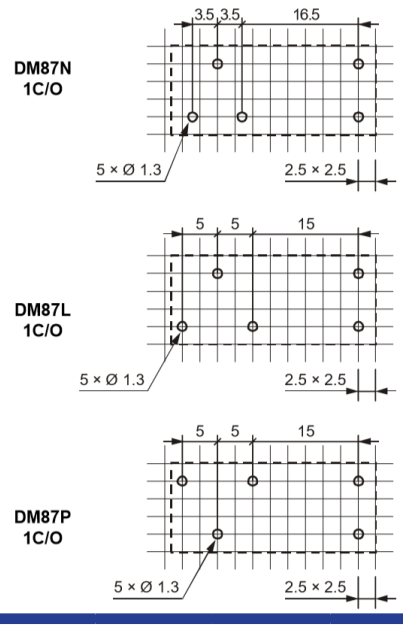
Standard coil rated voltages marked with bold type

AC Coil Data - 50/60Hz — Table 2

Coil code	Rated voltage (VAC)	Coil resistance Ω ±10% (at 0°C)	Coil operating voltage range (VAC@ 20°C 50Hz)	
			min.	max.
5012	12	100	9.6	13.2
5024	**24**	**400**	**19.2**	**28.8**
5048	48	1550	38.4	57.6
5060	60	2600	48.0	72.0
5110	110	8900	88.0	132.0
5115	115	9600	92.0	138.0
5120	120	10200	96.0	144.0
5220	220	35500	176.0	264.0
5230	**230**	**38500**	**184.0**	**276.0**
5240	240	42500 ±15%	192.0	288.0

Standard coil rated voltages marked with bold type

Mounting - PCB Layout (Solder side view — Fig. 1



Relay mounting

Relays DM87N are designed for:

- Direct PCB mounting.
- Mounting via PCB plug-in sockets, D14F-1Z-A1 or D14F-1Z-A2 and clip JH-15MS-A
- Mounting using 35mm DIN rail screw terminal sockets, D14F-1Z-C2, D14F-1Z-C3, D14F-1Z-C4, D14F-1ZC5 and clip JH-15PS.
- Indicator/protection modules type DM...are available for use with D14F-1Z DIN rail sockets.

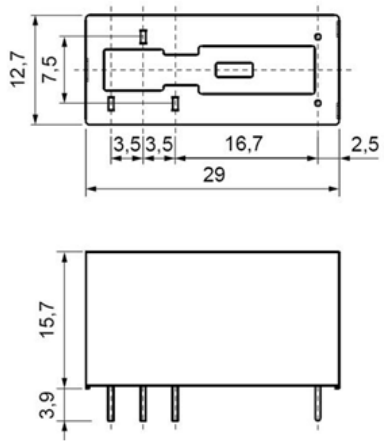
Relays DM87L and DM87P are designed for:

- Direct PCB mounting.
- Mounting via PCB plug-in sockets, D14F-2Z-A1 or D14F-2Z-A2 and clip JH-15MS-A.
- Mounting using 35mm DIN rail screw terminal sockets, D14F-2Z-C2, D14F-2Z-C3-N, D14F-2Z-C4, D14F-2Z-C5 and clip JH-15PS.
- Indicator/protection modules type DM...are available for use with D14F-2Z DIN rail sockets.

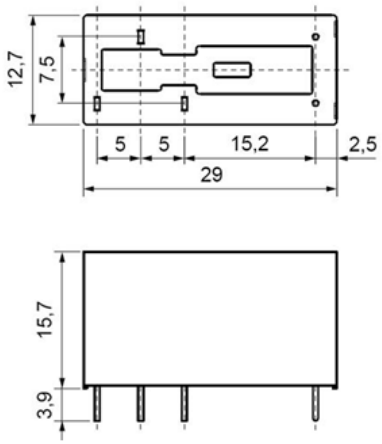
Dimensions mm

Fig. 2

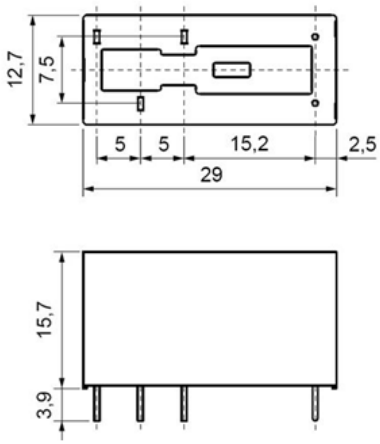
DM87N - 1CO (standard coil)



DM87L - 1CO (standard coil)

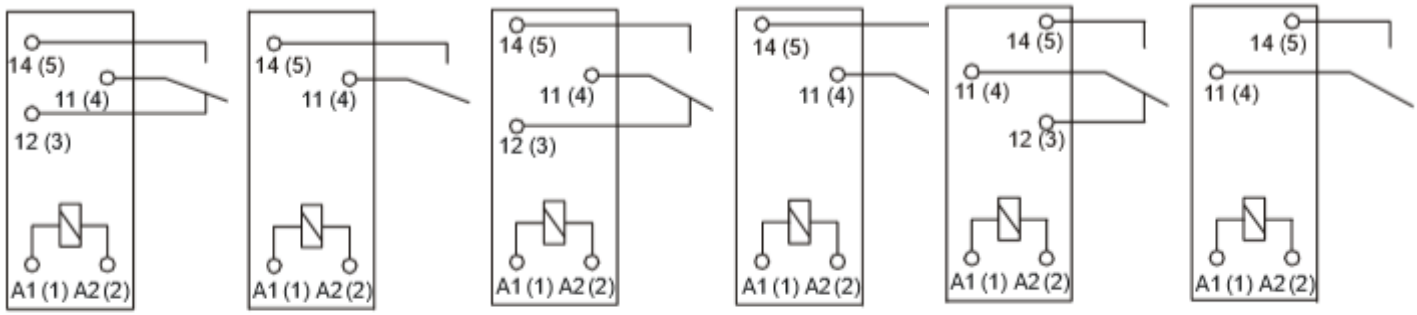


DM87P -1CO (standard coil)



Connection diagrams (pin side view)

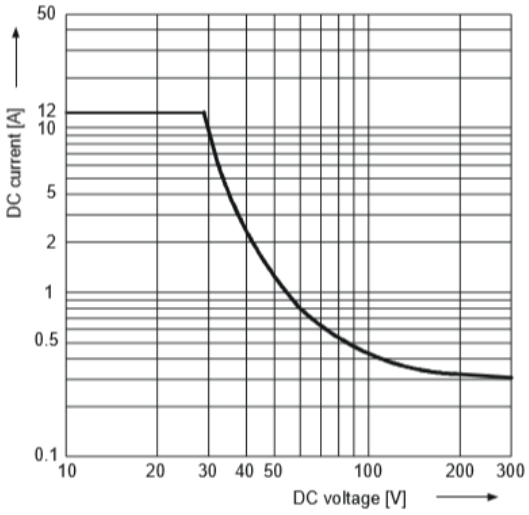
Fig. 2



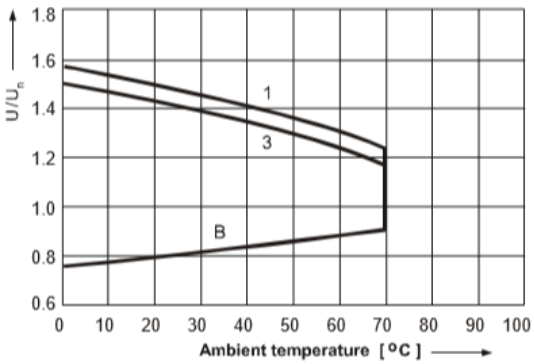
DM87N 1C/O | DM87N 1NO | DM87L 1C/O | DM87L 1NO | DM87P 1C/O | DM87P 1NO

Terminal (pin)	A1 (1); A2 (2)	12(3); 11(7);14(5)
mm	Ø 0.6	0.5 x 0.9
Drilling hole: • for relays • for sockets	Ø1.3 + 0.1mm Ø1.5 + 0.1mm	

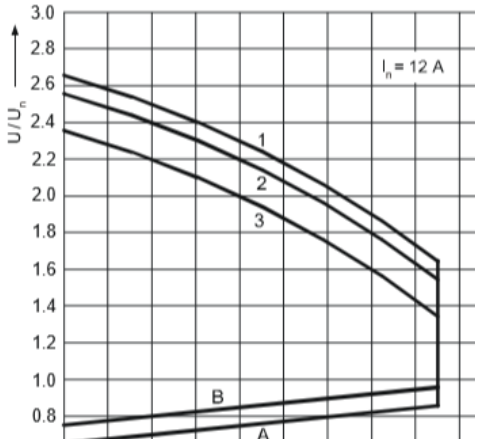
Max. DC resistive load breaking capacity — Fig. 3



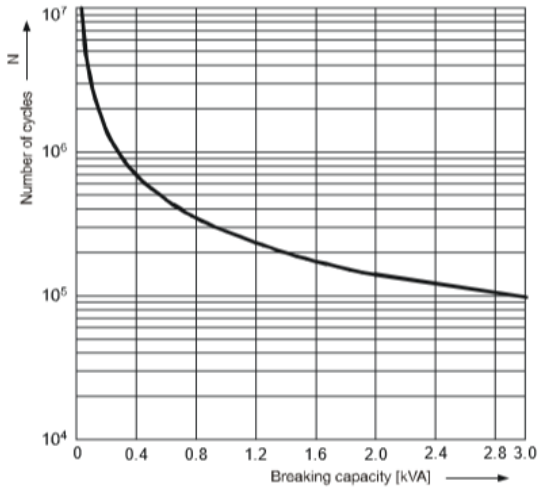
Coil operating range - AC 50Hz — Fig. 4



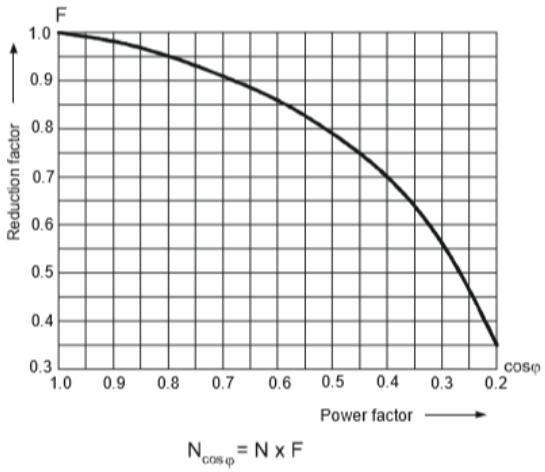
Coil operating range - DC — Fig. 5



Electrical life at AC resistive load Max. switching frequency at rated load — Fig. 6



Electrical life reduction factor at AC inductive load — Fig. 7



$N_{\cos\varphi} = N \times F$

Key for figures 7 & 8

Description of Fig. 7 and 8

A - relation between make voltage and ambient temperature at no load on contacts. Coil temperature and ambient temperature are equal before coil energizing. Make voltage is not higher than the value read on Y axis (multiplication of rated voltage).

B - relation between make voltage and ambient temperature after initial coil heating up with 1.1 U_n, at continuous load of I_n on contacts. Make voltage is not higher than the value read on Y axis (multiplication of rated voltage).

1, 2, 3 - values on Y axis represent allowed overvoltage on coil at certain ambient temperature and contact load:

1 - no load
2 - 50% of rated load
3 - rated load