



- 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



RoHS Compliant ✓

### Contacts

Contact arrangement	1C/O, 1NO
Contact material	AgNi, AgNi/Au 5 um, AgSnO <sub>2</sub>
Rated max. switching voltage	AC 250V / 400V
Min. switching voltage	5V AgNi, 5V AgNi/Au 5 um, 10V AgSnO <sub>2</sub>
Rated load	AC 12A / 250VAC DC 12A / 24VDC
Min. switching current	5mA AgNi, 2mA AgNi/Au 5um, 10mA AgSnO <sub>2</sub>
Max. inrush current	25A AgSnO <sub>2</sub>
Rated current	12A
Max. breaking capacity	AC1 3000VA
Min. breaking capacity	0.3W AgNi, 0.05W AgNi/Au 5 um, 1W AgSnO <sub>2</sub>
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 <sup>5</sup> 12A, 250VAC cosφ See figure 7 DC L/R=40 ms > 10 <sup>5</sup> 0.15 A, 220VDC
Mechanical life	ops. > 3 x 10 <sup>7</sup>

### 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

Coil code:

See table  
1 & 2

PCB Layout

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

Contact material

20: AgNi  
23: AgNi/Au 5m  
30: AgSnO<sub>2</sub>

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

Minimum order quantities may apply for some combinations.

**DC Coil Data**
**Table 1**

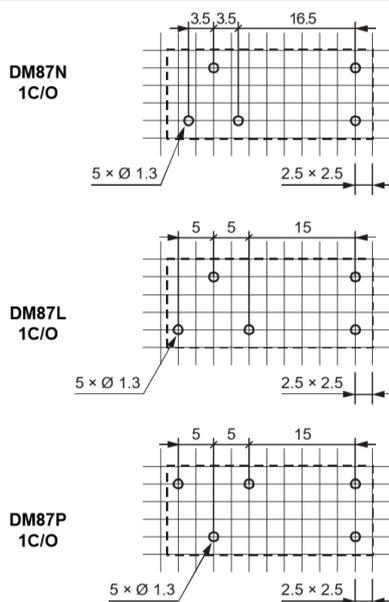
Coil code	Rated voltage (VDC)	Coil resistance $\Omega \pm 10\%$ (at 20°C)	Coil operating voltage range (VDC@ 20°C)	
			min.	max.
1003	3	22	2.1	7.6
1005	5	60	3.5	12.7
1006	6	90	4.2	15.3
1009	9	200	6.3	22.9
1012	12	360	8.4	30.6
1018	18	710	12.6	45.9
<b>1024</b>	<b>24</b>	<b>1440</b>	<b>16.8</b>	<b>61.2</b>
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 $\Omega \pm 10\%$ (at 0°C)	Coil operating voltage range (VAC@ 20°C 50Hz)	
			min.	max.
5012	12	100	9.6	13.2
<b>5024</b>	<b>24</b>	<b>400</b>	<b>19.2</b>	<b>28.8</b>
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
<b>5230</b>	<b>230</b>	<b>38500</b>	<b>184.0</b>	<b>276.0</b>
5240	240	42500 $\pm 15\%$	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:

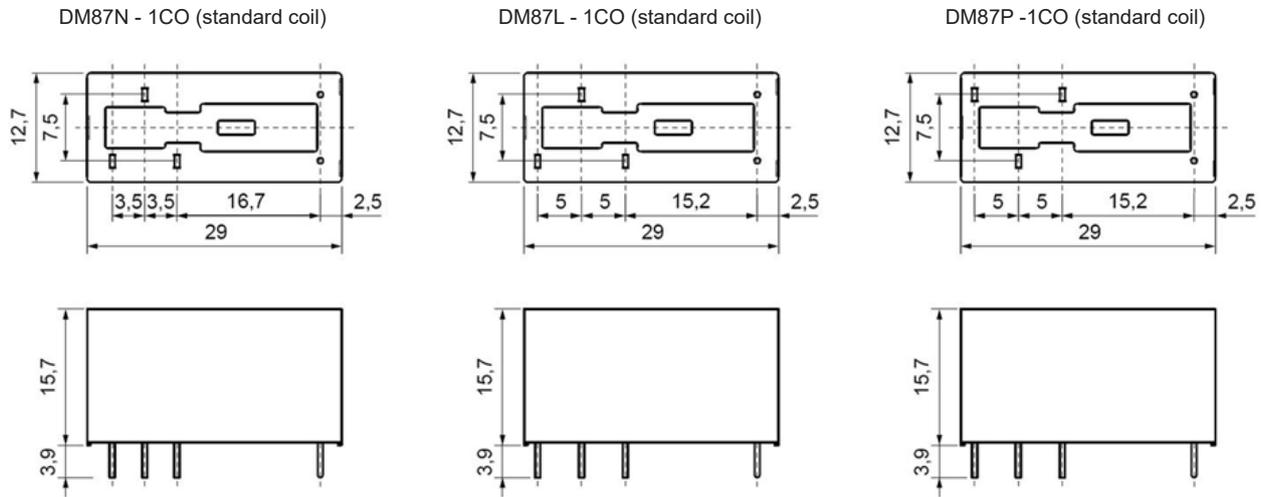
- Direct PCB mounting.
- Mounting via PCB plug-in sockets, D14F-1Z-A1 or D14F-1Z-A2 and clip JH-15MS-A
- Mounting using 35mm DIN rail screw terminal sockets, D14F-1Z-C2, D14F-1Z-C3, D14F-1Z-C4, D14F-1Z-C5 and clip JH-15PS.
- Indicator/protection modules type DM...are available for use with D14F-1Z DIN 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.

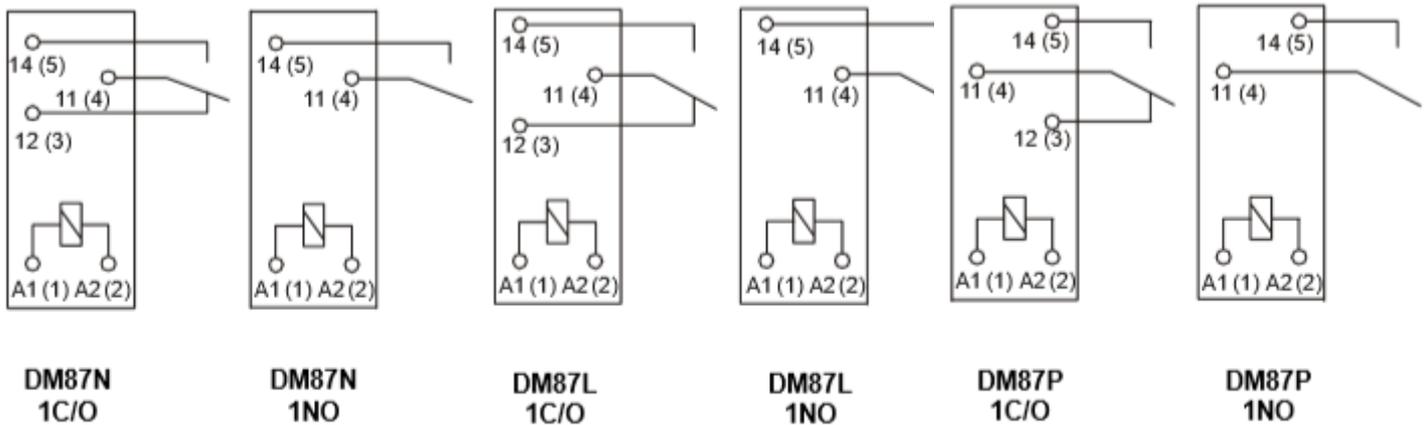
### Dimensions mm

Fig. 2



### Connection diagrams (pin side view)

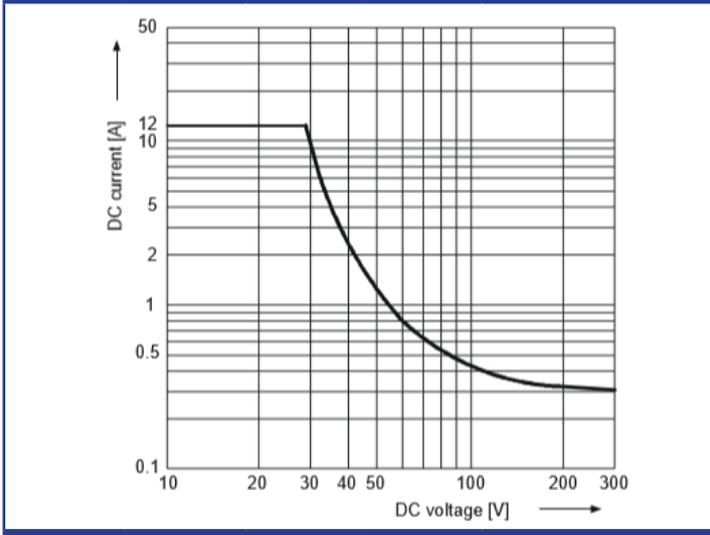
Fig. 2



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 Ø1.3 + 0.1mm		
• for sockets Ø1.5 + 0.1mm		

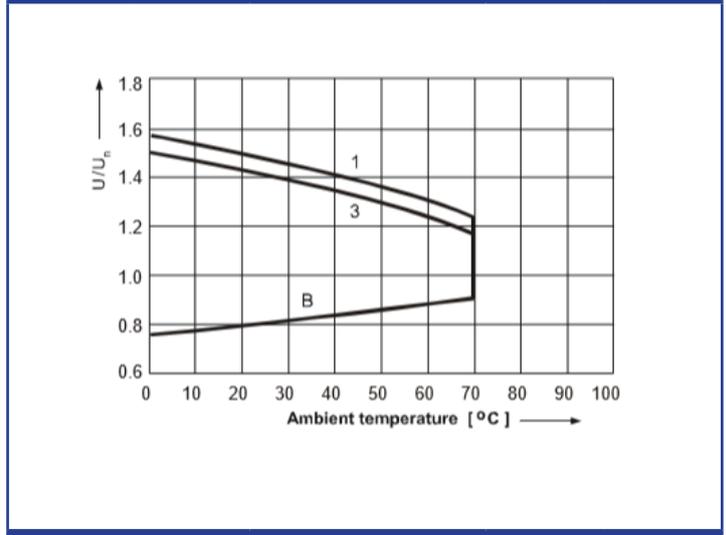
Max. DC resistive load breaking capacity

Fig. 3



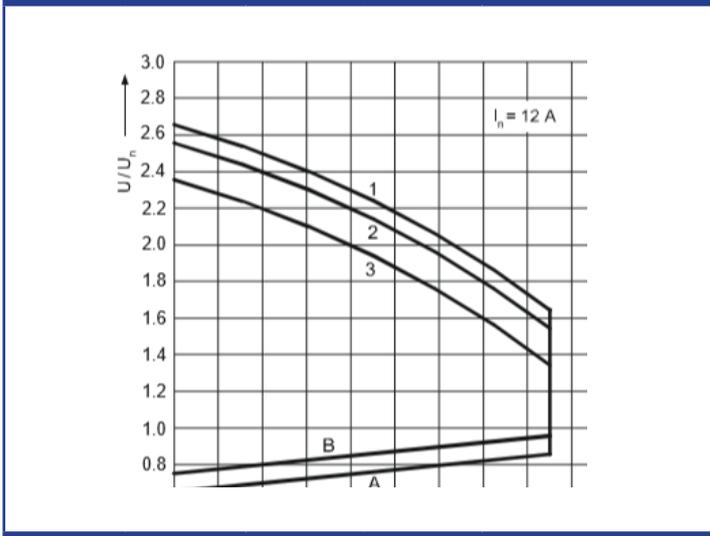
Coil operating range - AC 50Hz

Fig. 4



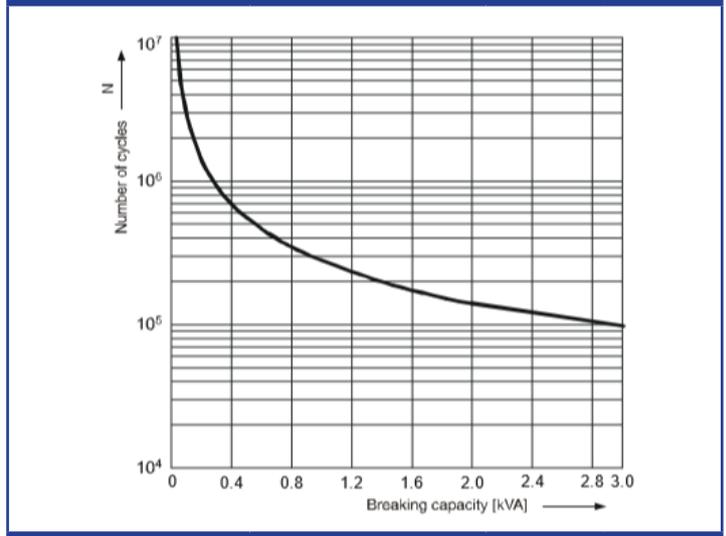
Coil operating range - DC

Fig. 5



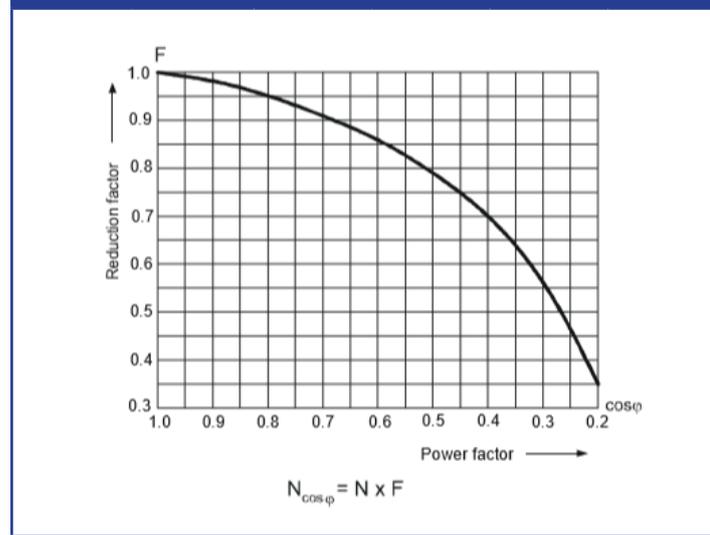
Electrical life at AC resistive load  
Max. switching frequency at rated load

Fig. 6



Electrical life reduction factor at AC inductive load

Fig. 7



### 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