RM87, RM87 sensitive

miniature relays

RM87N-...-01 ❶

RM87N sensitive

NEW product

- Cadmium - free contacts • Height 15,7 mm
- 5000 V / 10 mm reinforced insulation • For PCB and plug-in sockets
- Accessories: sockets and modules • **AC and DC coils - standard (RM87), DC coils - sensitive (RM87 sensitive)**
- Available special versions: with transparent cover ❶; with the increased dielectric strength of the contact clearance ❷
- Compliance with standard PN-EN 60335-1
- Recognitions, certifications, directives: RoHS,

Contact data

Number and type of contacts		1 C/O, 1 NO ❷ standard version	1 NO sensitive version
Contact material		**AgNi**, AgNi/Au 5 µm, $AgSnO_2$	
Rated / max. switching voltage	AC	250 V / 440 V	
Min. switching voltage		5 V AgNi, 5 V AgNi/Au 5 µm, 10 V $AgSnO_2$	
Rated load (capacity)	AC1	12 A / 250 V AC standard version	10 A / 250 V AC sensitive version
	AC15	3 A / 120 V	1,5 A / 240 V (B300)
	AC3	750 W (single-phase motor)	
	DC1	12 A / 24 V DC standard version (see Fig. 3)	
		10 A / 24 V DC sensitive version (see Fig. 4)	
	DC13	0,22 A / 120 V	0,1 A / 250 V (R300)
Min. switching current		5 mA AgNi, 2 mA AgNi/Au 5 µm, 10 mA $AgSnO_2$	
Max. inrush current		25 A $AgSnO_2$ standard version	20 A $AgSnO_2$ sensitive version
Rated current		12 A standard version	10 A sensitive version
Max. breaking capacity	AC1	3 000 VA standard version	2 500 VA sensitive version
Min. breaking capacity		0,3 W AgNi, 0,05 W AgNi/Au 5 µm, 1 W $AgSnO_2$	
Contact resistance		≤ 100 mΩ	
Max. operating frequency			
• at rated load	AC1	600 cycles/hour	
• no load		72 000 cycles/hour	

Coil data

Rated voltage	50/60 Hz AC	12 ... 240 V standard version	
	DC	3 ... 110 V standard version	5 ... 48 V sensitive version
Must release voltage		AC: ≥ 0,15 U_n	DC: ≥ 0,1 U_n
Operating range of supply voltage		see Tables 1, 3 and Fig. 5, 7 standard version	
		see Table 2 and Fig. 6 sensitive version	
Rated power consumption	AC	0,75 VA standard version	
	DC	0,4 ... 0,48 W standard version	0,25 W sensitive version

Insulation according to PN-EN 60664-1

Insulation rated voltage		400 V AC	
Rated surge voltage		4 000 V	1,2 / 50 µs
Overvoltage category		III	
Insulation pollution degree		3	
Dielectric strength	• between coil and contacts	5 000 V AC	type of insulation: reinforced
	• contact clearance	1 000 V AC	type of clearance: micro-disconnection
		2 000 V AC	contact 1 NO, type of clearance: full-disconnection ❷
Contact - coil distance	• clearance	≥ 10 mm	
	• creepage	≥ 10 mm	

General data

Operating / release time (typical values)		7 ms / 3 ms	
Electrical life (number of cycles)	• resistive AC1	> 10^5	12 A, 250 V AC standard version
		> 1,7 x 10^5	10 A, 250 V AC sensitive version
	• cosϕ	see Fig. 2	
	• DC L/R=40 ms	> 10^5	0,15 A, 220 V DC
Mechanical life (cycles)		> 3 x 10^7	
Dimensions (L x W x H)		29 x 12,7 x 15,7 mm	
Weight		14 g	
Ambient temperature	• storage	-40...+85 °C	
	• operating	AC: -40...+70 °C	DC: -40...+85 °C
Cover protection category		IP 40 or **IP 67**	PN-EN 60529
Environmental protection		RTII or **RTIII**	PN-EN 116000-3
Shock / vibration resistance		30 g / 10 g	10...150 Hz
Solder bath temperature / Soldering time		max. 270 °C / max. 5 s	

The data in bold type pertain to the standard versions of the relays. ❶ Available special version (only for RM87 - standard version): relays in transparent cover - see "Ordering codes" ❷ Available special version with contact 1 NO (only for RM87 - standard version): relays with increased contact gap, dielectric strength 2000 V AC - see "Ordering codes"

Coil data - DC voltage version, **RM87** - standard version — Table 1

Coil code	Rated voltage V DC	Coil resistance at 20 °C Ω	Acceptable resistance	Coil operating range V DC	
				min. (at 20 °C)	max. (at 20 °C)
1003	3	22	± 10%	2,1	7,6
1005	5	60	± 10%	3,5	12,7
1006	6	90	± 10%	4,2	15,3
1009	9	200	± 10%	6,3	22,9
1012	12	360	± 10%	8,4	30,6
1018	18	710	± 10%	12,6	45,9
1024	**24**	**1 440**	**± 10%**	**16,8**	**61,2**
1036	36	3 140	± 10%	25,2	91,8
1048	48	5 700	± 10%	33,6	122,4
1060	60	7 500	± 10%	42,0	153,0
1110	110	25 200	± 10%	77,0	280,0

The data in bold type pertain to the standard versions of the relays.

Coil data - DC voltage version, **RM87 sensitive** - sensitive version — Table 2

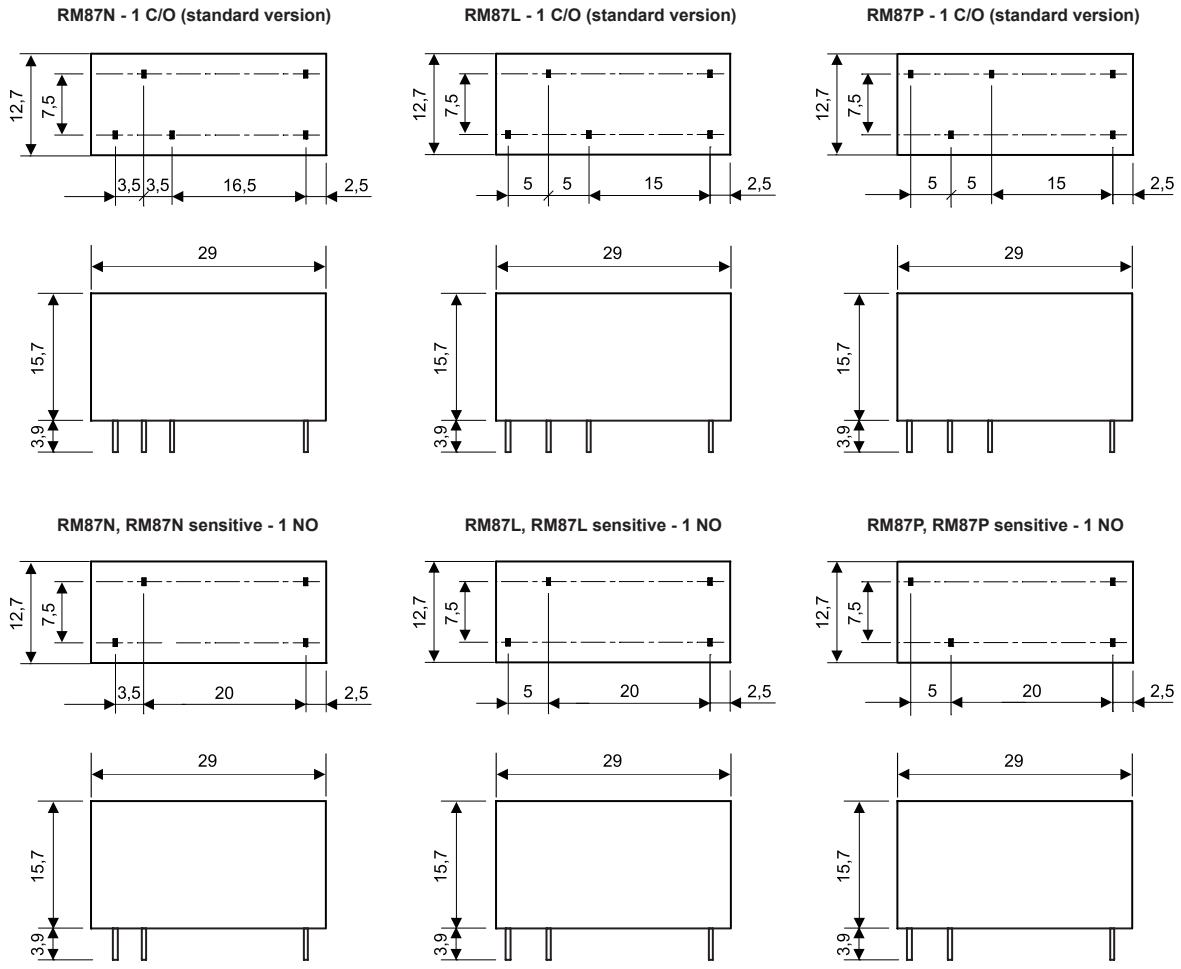
Coil code	Rated voltage V DC	Coil resistance at 20 °C Ω	Acceptable resistance	Coil operating range V DC	
				min. (at 20 °C)	max. (at 20 °C)
S005	5	102	± 10%	3,75	15,0
S006	6	144	± 10%	4,50	18,0
S009	9	330	± 10%	6,75	27,0
S010	10	400	± 10%	7,50	30,0
S012	12	580	± 10%	9,00	36,0
S018	18	1 300	± 10%	13,50	54,0
S024	24	2 300	± 10%	18,00	72,0
S048	48	9 340	± 10%	36,00	144,0

Coil data - AC 50/60 Hz voltage version, **RM87** - standard version — Table 3

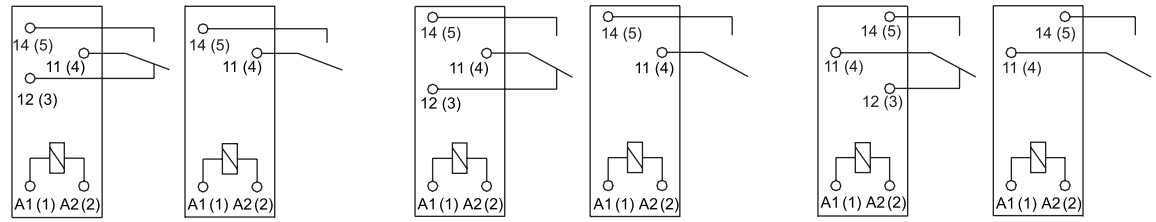
Coil code	Rated voltage V AC	Coil resistance at 20 °C Ω	Acceptable resistance	Coil operating range V AC 50 Hz	
				min. (at 20 °C)	max. (at 20 °C)
5012	12	100	± 10%	9,6	13,2
5024	**24**	**400**	**± 10%**	**19,2**	**28,8**
5048	48	1 550	± 10%	38,4	57,6
5060	60	2 600	± 10%	48,0	72,0
5110	110	8 900	± 10%	88,0	132,0
5115	115	9 600	± 10%	92,0	138,0
5120	120	10 200	± 10%	96,0	144,0
5220	220	35 500	± 10%	176,0	264,0
5230	**230**	**38 500**	**± 10%**	**184,0**	**276,0**
5240	240	42 500	± 15%	192,0	288,0

The data in bold type pertain to the standard versions of the relays.

Dimensions

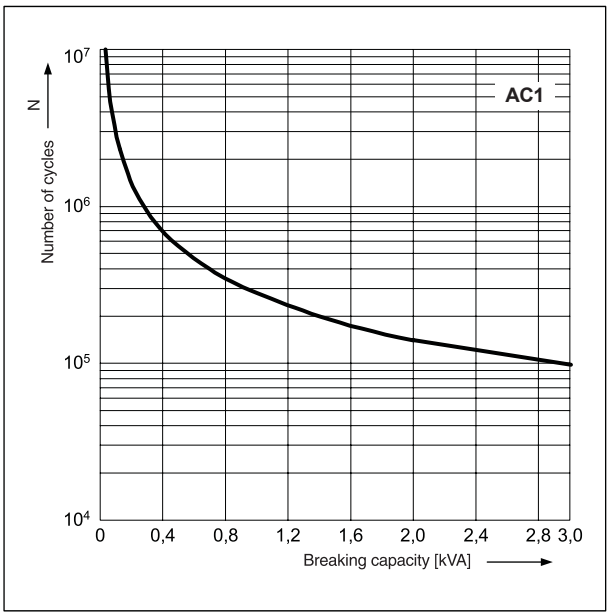


Connection diagrams (pin side view)

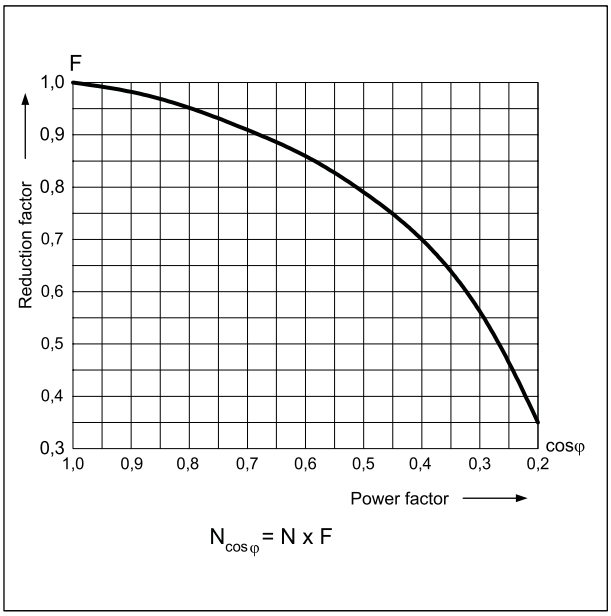


Terminal (pin)	A1(1); A2(2)	12(3); 11(4); 14(5)
[mm]	Ø 0,6	0,5 x 0,9
Drilling hole: • for relays • for sockets	 Ø 1,3 + 0,1 mm Ø 1,5 + 0,1 mm	

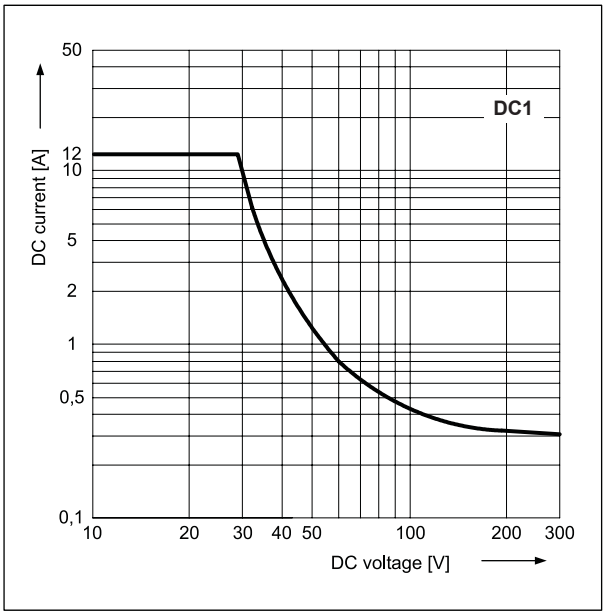
Electrical life at AC resistive load. Switching frequency: 600 cycles/hour Fig. 1



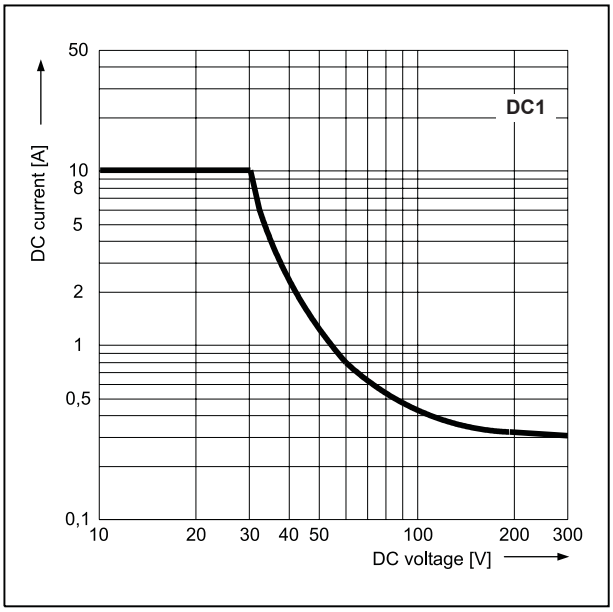
Electrical life reduction factor at AC inductive load Fig. 2



Max. DC resistive load breaking capacity - standard version Fig. 3

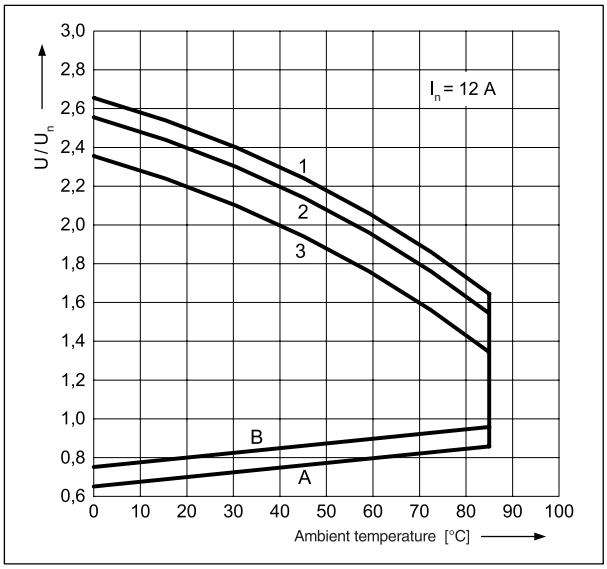


Max. DC resistive load breaking capacity - sensitive version Fig. 4



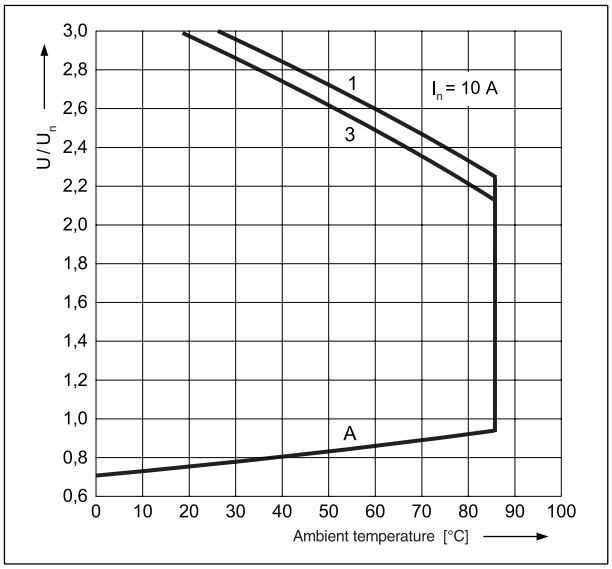
Coil operating range - DC - standard version

Fig. 5



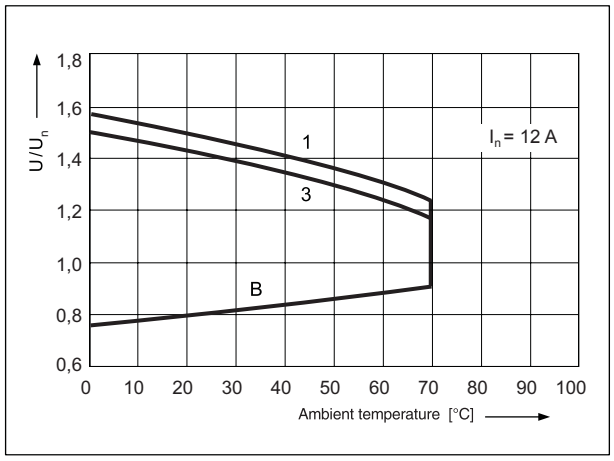
Coil operating range - DC - sensitive version

Fig. 6



Coil operating range - AC 50 Hz

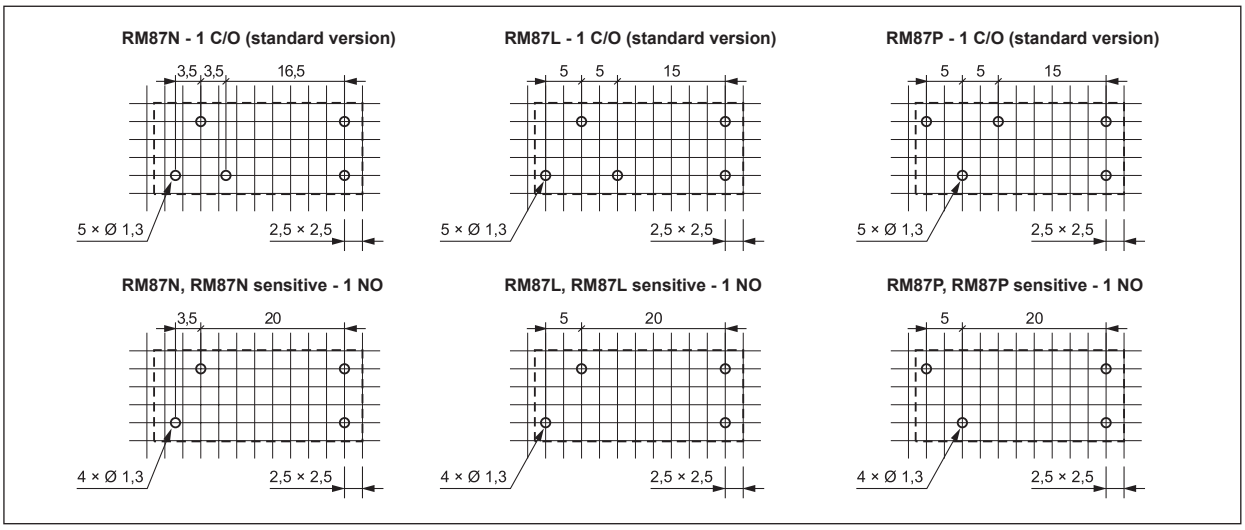
Fig. 7



Description of Fig. 5, 6 and 7

A - relations 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 - relations between make voltage and ambient temperature after initial coil heating up with 1,1 U_n, at continues 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

Pinout (solder side view)



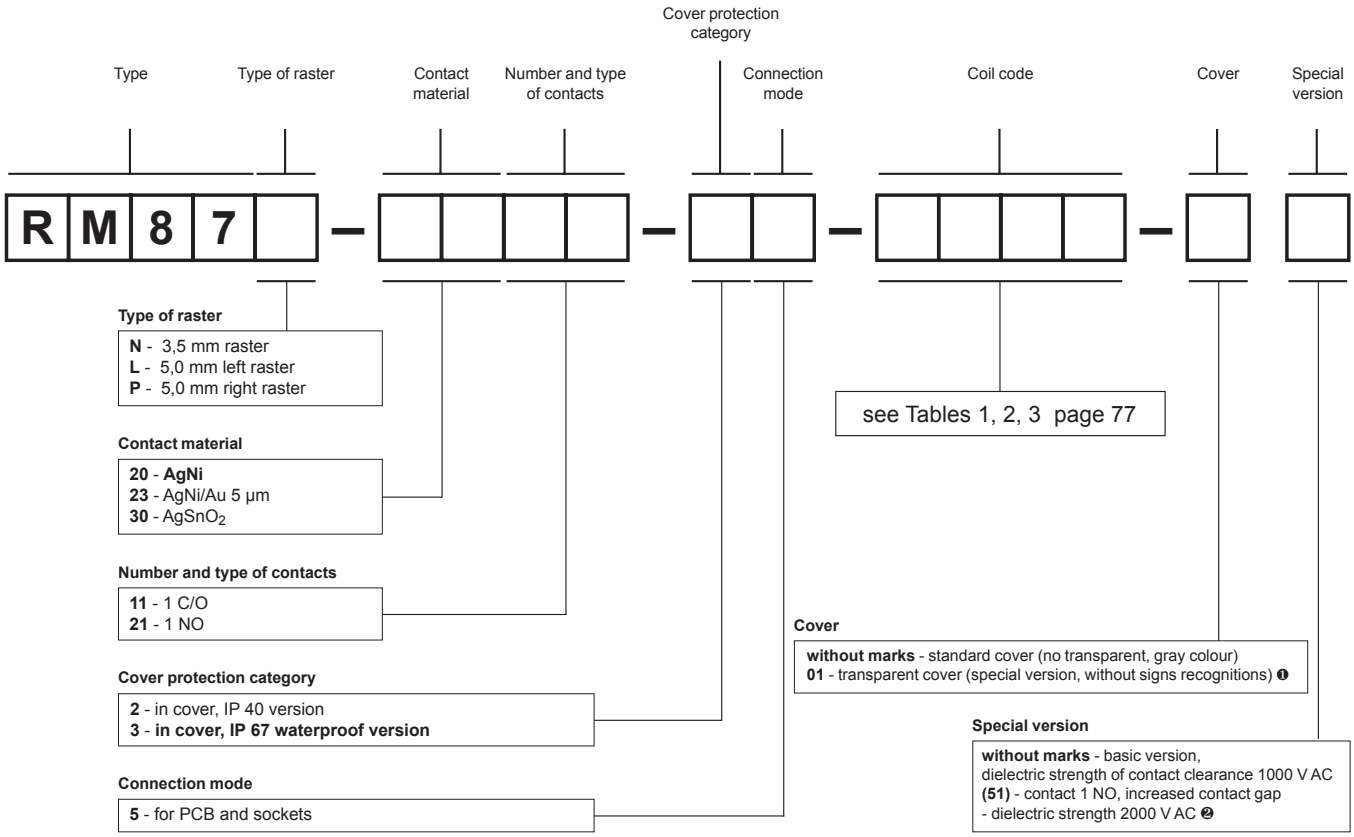
Mounting

Relays **RM87N**, **RM87N sensitive** are designed for: • direct PCB mounting • screw terminals plug-in sockets **GZT92** ❸ and **GZM92** ❸ with clip **GZT80-0040** or **GZM80-0041**; plug-in sockets **GZS92** ❸ with clip **GZS-0040** or **GZM80-0041**, 35 mm rail mount acc. to PN-EN 60715 or on panel mounting with one M3 screw. Signalling / protecting modules **type M...** are available with sockets (see page 250) • plug-in sockets for PCB mounting **EC35** with clip **MP16-2**, MH16-2; plug-in sockets **GD35** with clip **MP16-2**, GD-0016, MH16-2.

Relays **RM87L**, **RM87L sensitive**, **RM87P**, **RM87P sensitive** are designed for: • direct PCB mounting • screw terminals plug-in sockets **GZT80** ❸ and **GZM80** ❸ with clip **GZT80-0040** or **GZM80-0041**; plug-in sockets **GZS80** ❸ with clip **GZS-0040** or **GZM80-0041**, 35 mm rail mount acc. to PN-EN 60715 or on panel mounting with one M3 screw. Signalling / protecting modules **type M...** are available with sockets (see page 250) • plug-in sockets for PCB mounting **EC50** with clip **MP16-2**, MH16-2; plug-in sockets **PW80** with clip **MH16-2**; plug-in sockets **GD50** with clip **MP16-2**, GD-0016, MH16-2.

❸ Plug-in sockets **GZT92**, **GZM92**, **GZS92** and **GZT80**, **GZM80**, **GZS80** may be linked with interconnection strip type **ZGGZ80** (see page 261).

Ordering codes



Examples of ordering code:

RM87N-2011-25-1012-01	relay **RM87N**, 3,5 mm raster, contact material AgNi, with one changeover contact, in transparent cover (special version, without signs recognitions) ❶ IP 40, for PCB and sockets, voltage version 12 V DC
RM87N-2021-35-1024 (51)	relay **RM87N**, 3,5 mm raster, contact material AgNi, with one normally open contact, special version ❷ with increased contact gap, in standard cover (no transparent, gray colour) IP 67, for PCB and sockets, voltage version 24 V DC
RM87P-3021-25-S012	relay **RM87P sensitive**, 5 mm right raster, contact material $AgSnO_2$, with one normally open contact, in standard cover (no transparent, gray colour) IP 40, for PCB and sockets, sensitive voltage version 12 V DC

RM87N SMT

miniature relays

- Cadmium - free contacts
- Height 15,7 mm
- 5000 V / 10 mm reinforced insulation
- **For surface mounting SMT**
- AC and DC coils
- Compliance with standard PN-EN 60335-1
- Recognitions, certifications, directives: RoHS,

Contact data

Number and type of contacts		1 C/O
Contact material		**AgNi**, AgNi/Au 5 µm, $AgSnO_2$
Rated / max. switching voltage	AC	250 V / 440 V
Min. switching voltage		5 V AgNi, 5 V AgNi/Au 5 µm, 10 V $AgSnO_2$
Rated load (capacity)	AC1	12 A / 250 V AC
	AC15	3 A / 120 V 1,5 A / 240 V (B300)
	AC3	750 W (single-phase motor)
	DC1	12 A / 24 V DC (see Fig. 3)
	DC13	0,22 A / 120 V 0,1 A / 250 V (R300)
Min. switching current		5 mA AgNi, 2 mA AgNi/Au 5 µm, 10 mA $AgSnO_2$
Max. inrush current		25 A $AgSnO_2$
Rated current		12 A
Max. breaking capacity	AC1	3 000 VA
Min. breaking capacity		0,3 W AgNi, 0,05 W AgNi/Au 5 µm, 1 W $AgSnO_2$
Contact resistance		≤ 100 mΩ
Max. operating frequency		
• at rated load	AC1	600 cycles/hour
• no load		72 000 cycles/hour

Coil data

Rated voltage	50/60 Hz AC	12 ... 240 V
	DC	3 ... 110 V
Must release voltage		AC: ≥ 0,15 U_n DC: ≥ 0,1 U_n
Operating range of supply voltage		see Tables 1, 2 and Fig. 4, 5
Rated power consumption	AC	0,75 VA
	DC	0,4 ... 0,48 W

Insulation according to PN-EN 60664-1

Insulation rated voltage	400 V AC
Rated surge voltage	4 000 V 1,2 / 50 µs
Overvoltage category	III
Insulation pollution degree	3
Dielectric strength	
• between coil and contacts	5 000 V AC type of insulation: reinforced
• contact clearance	1 000 V AC type of clearance: micro-disconnection
Contact - coil distance	
• clearance	≥ 10 mm
• creepage	≥ 10 mm

General data

Operating / release time (typical values)		7 ms / 3 ms
Electrical life (number of cycles)		
• resistive AC1		> 10^5 12 A, 250 V AC
• cosϕ		see Fig. 2
• DC L/R=40 ms		> 10^5 0,15 A, 220 V DC
Mechanical life (cycles)		> 3 x 10^7
Dimensions (L x W x H)		29 x 12,7 x 15,7 (17,7) mm
Weight		14 g
Ambient temperature	• storage	-40...+85 °C
	• operating	AC: -40...+70 °C DC: -40...+85 °C
Cover protection category		IP 40 PN-EN 60529
Environmental protection		RTII PN-EN 116000-3
Shock resistance		30 g
Vibration resistance		10 g 10...150 Hz
Solder bath temperature		max. 270 °C
Soldering time		max. 5 s

The data in bold type pertain to the standard versions of the relays.

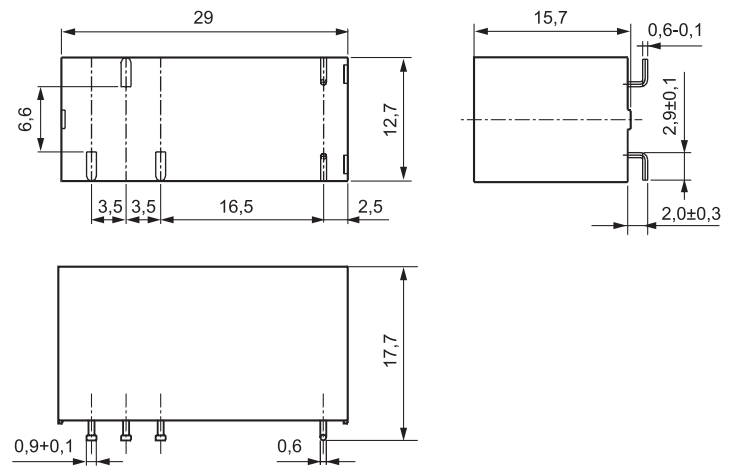
Coil data - DC voltage version — Table 1

Coil code	Rated voltage V DC	Coil resistance at 20 °C Ω	Acceptable resistance	Coil operating range V DC	
				min. (at 20 °C)	max. (at 20 °C)
1003	3	22	± 10%	2,1	7,6
1005	5	60	± 10%	3,5	12,7
1006	6	90	± 10%	4,2	15,3
1009	9	200	± 10%	6,3	22,9
1012	12	360	± 10%	8,4	30,6
1018	18	710	± 10%	12,6	45,9
1024	24	1 440	± 10%	16,8	61,2
1036	36	3 140	± 10%	25,2	91,8
1048	48	5 700	± 10%	33,6	122,4
1060	60	7 500	± 10%	42,0	153,0
1110	110	25 200	± 10%	77,0	280,0

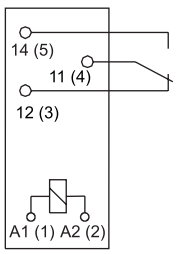
Coil data - AC 50/60 Hz voltage version — Table 2

Coil code	Rated voltage V AC	Coil resistance at 20 °C Ω	Acceptable resistance	Coil operating range V AC 50 Hz	
				min. (at 20 °C)	max. (at 20 °C)
5012	12	100	± 10%	9,6	13,2
5024	24	400	± 10%	19,2	28,8
5048	48	1 550	± 10%	38,4	57,6
5060	60	2 600	± 10%	48,0	72,0
5110	110	8 900	± 10%	88,0	132,0
5115	115	9 600	± 10%	92,0	138,0
5120	120	10 200	± 10%	96,0	144,0
5220	220	35 500	± 10%	176,0	264,0
5230	230	38 500	± 10%	184,0	276,0
5240	240	42 500	± 15%	192,0	288,0

Dimensions



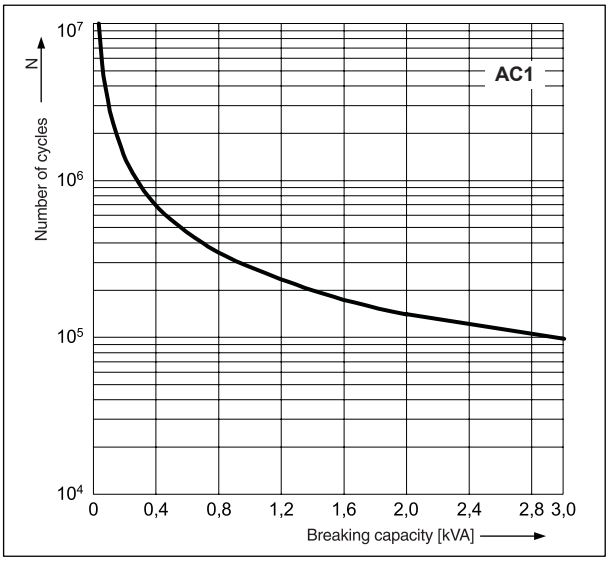
Connection diagram
(pin side view)



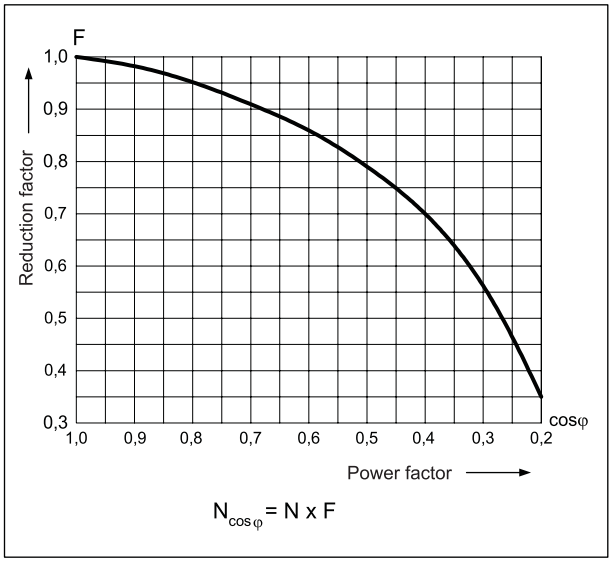
RM87N
1 C/O

Terminal (pin)	A1(1); A2(2)	12(3); 11(4); 14(5)
[mm]	Ø 0,6	0,5 x 0,9

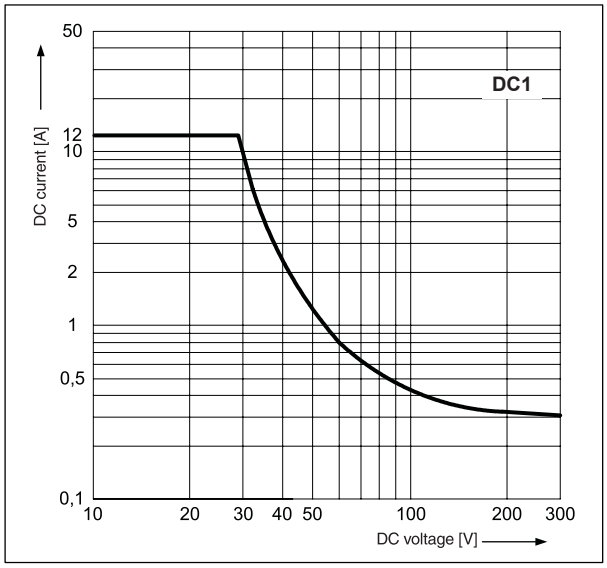
Electrical life at AC resistive load. Switching frequency: 600 cycles/hour Fig. 1



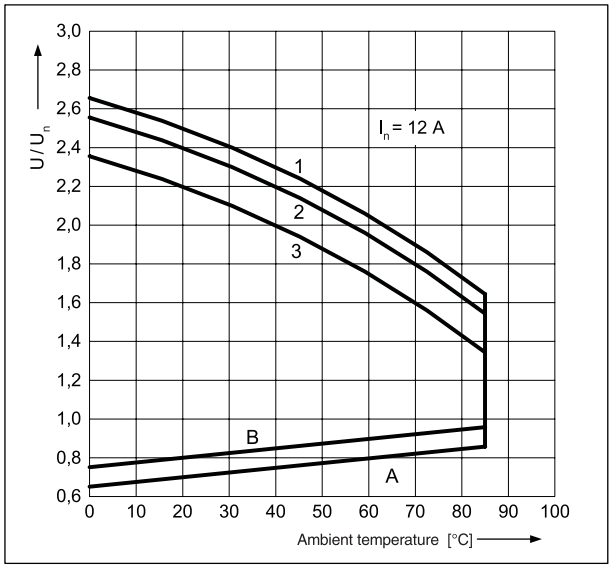
Electrical life reduction factor at AC inductive load Fig. 2



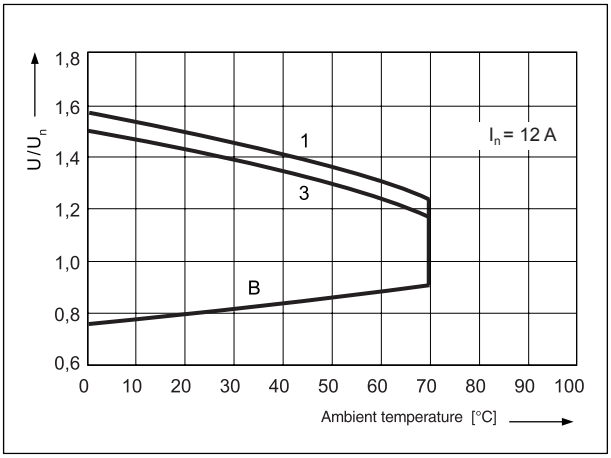
Max. DC resistive load breaking capacity Fig. 3



Coil operating range - DC Fig. 4



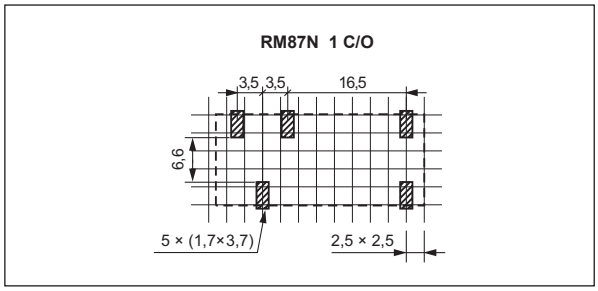
Coil operating range - AC 50 Hz Fig. 5



Description of Fig. 4 and 5

A - relations 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 - relations between make voltage and ambient temperature after initial coil heating up with 1,1 U_n, at continues 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

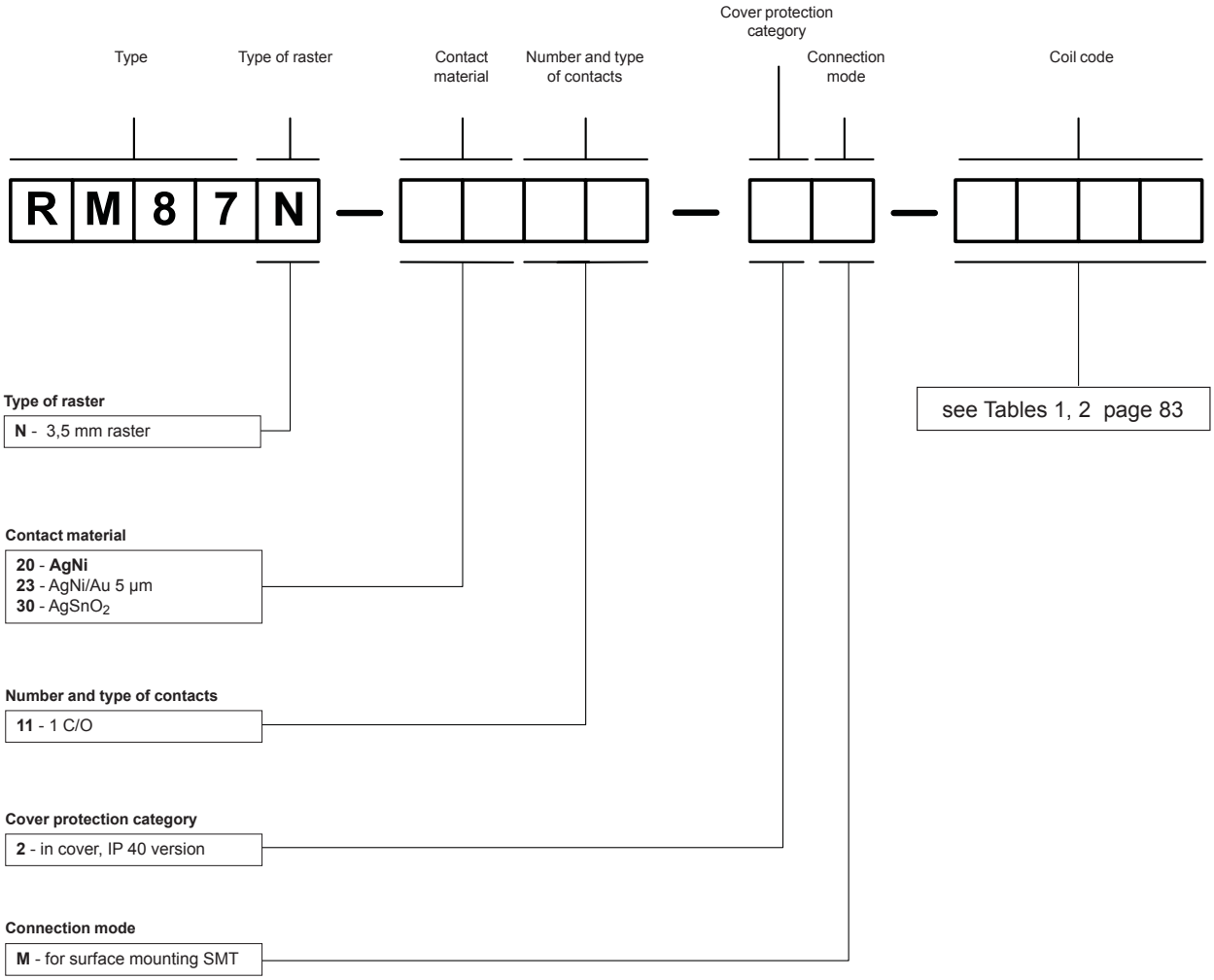
Soldering areas (solder side view)



Mounting

Relays **RM87N SMT** are designed for surface mounting SMT.

Ordering codes



Example of ordering code:

RM87N-2011-2M-1012 relay **RM87N SMT**, 3,5 mm raster, contact material AgNi, with one changeover contact, in cover IP 40, for surface mounting SMT, voltage version 12 V DC