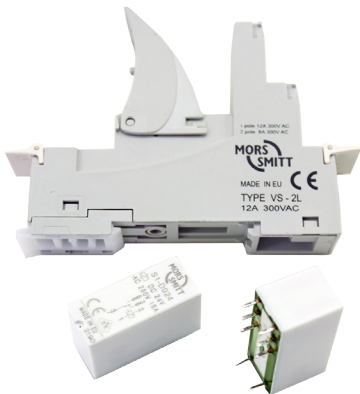


/// Plug-in general purpose relay

S-relay

Miniature relay, 1 or 2 pole, 8-16 A



Features

- Miniature PCB plug-in design
- 1 or 2 C/O contacts
- Rated load AC1 8-16 A
- Wide range of coil voltages, AC and DC coils
- Plug-in LED indicator optional
- Surge suppression diode optional
- IP67 Protection
- Sealed for wave soldering and cleaning
- Mounting on PCB or socket

Description

S1 and S2 are miniature industrial relays for general purpose applications.

Rated contact switching current up to 16 A, depending on relay type

The relay may be PCB mounted or fitted into a suitable relay socket. It has high electrical insulation strength and waterproof protection.

Suitable for a wide range of applications.

Accessories include also retainer clips and connection strips.

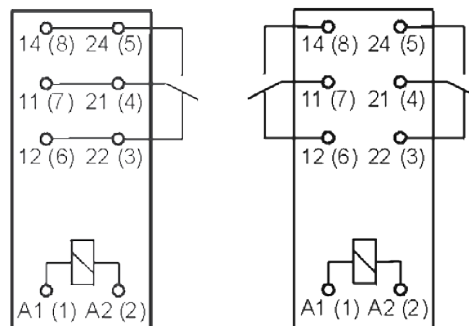
Application

Miniature relays may be applied in alarm systems, as interface systems in industrial automation, power-electric systems, lighting control systems (e.g. in daylight-saving switches), staircase systems of household and catering industry equipment and in numerous electric appliances.

Connection diagram

S1

S2



Terminal (pin)	A1(1); A2(2)	22(3); 21(4); 24(5); 12(6); 11(7); 14(8)
[mm]	Ø 0,6	0,5 x 0,9
Drilling hole:		
• for relays	Ø 1,3 + 0,1 mm	
• for sockets	Ø 1,5 + 0,1 mm	

Approvals

EN 60335-1 RoHs
 EN 60255 EN61810-1:2008
 EN 60947
 EN 60947-5-1
 IEC 61810



Miniature relay S-relay

Coil characteristics DC-versions

Operating time at nominal voltage	
Pull-in time	7 ms
Release time	3 ms
Operating voltage range in %	0.7 - 1.4 Unom (depending on temperature, see pages 6 & 7)
Nominal power consumption	0.4 - 0.48 W
Min hold-up voltage	0.1 Unom

Type	Rated voltage Un VDC	Coil resistance ± 10 % at 20 °C Ω	Coil operating range VDC	
			min. (at 20°C)	max. (at 20°C)
D 003	3	22	3.1	7.6
D 005	5	60	3.5	12.7
D 006	6	90	4.2	15.3
D 009	9	200	6.3	22.9
D 012	12	360	8.4	30.6
D 018	18	710	12.6	45.9
D 024	24	1440	16.8	61.2
D 036	36	3140	25.2	91.8
D 048	48	5700	33.6	122.4
D 060	60	7500	42.0	153.0
D 110	110	25200	77.0	280.0

Other voltages on request

Coil characteristics AC-versions

Operating time at nominal voltage	
Pull-in time	10 ms
Release time	8 ms
Operating voltage range in %	0.75 - 1.1 Unom
Nominal power consumption	1.6 VA
Min hold-up voltage	0.2 Unom

Type	Rated voltage Un VAC	Coil resistance ± 15 % at 20 °C Ω	Coil operating range VAC	
			min. (at 20°C)	max. (at 20°C)
A 012	12	100	9.6	13.2
A 024	24	400	19.2	26.4
A 048	48	1550	38.4	52.8
A 060	60	2600	48.0	72.0
A 110	110	8900	88.0	132.0
A 115	115	9600	92.0	138.0
A 120	120	10200	96.0	144.0
A 220	220	35500	176.0	264.0
A 230	230	28500	184.0	276.0
A 240	240	42500	192.0	288.0

Other voltages on request

Miniature relay S-relay

Contact characteristics

	S1	S2
Maximum inrush current	30 A	15 A
Maximum continuous current	16 A	8 A
Maximum switching voltage	250 VDC, 400 VAC	
Minimum switching voltage/current AgNi	10 V / 5 mA	
Material	AgNi*	
Contact resistance	≤100 mΩ	

* AgNi/Au 5 μm or AgSnO₂ on request

Performance characteristics

Electrical life (number of cycles) - Resistive AC1 - DC L/R = 40 ms	> 10 ⁵ , 8 A, 250 VAC > 10 ⁵ , 0.15 A, 220 VDC
Mechanical life	≥ 3 x 10 ⁷ cycles (Unpowered)
Dielectric strength	Between coil contacts 5000 VAC Contact clearance 1000 VAC Pole-pole 2500 VAC
Max. operating frequency	At rated load 600 cycles/hour (AC1) No load 72000 cycles/hour
Max. operating frequency	At rated load 1200 cycles/hour (AC1) No load M2: 12000 cycles/hour, M3&M4: 18000 cycles/hour

Mechanical characteristics

Dimensions (d x w x h)	29 x 12.7 x 15.7 mm
Weight	14 g

Environmental characteristics

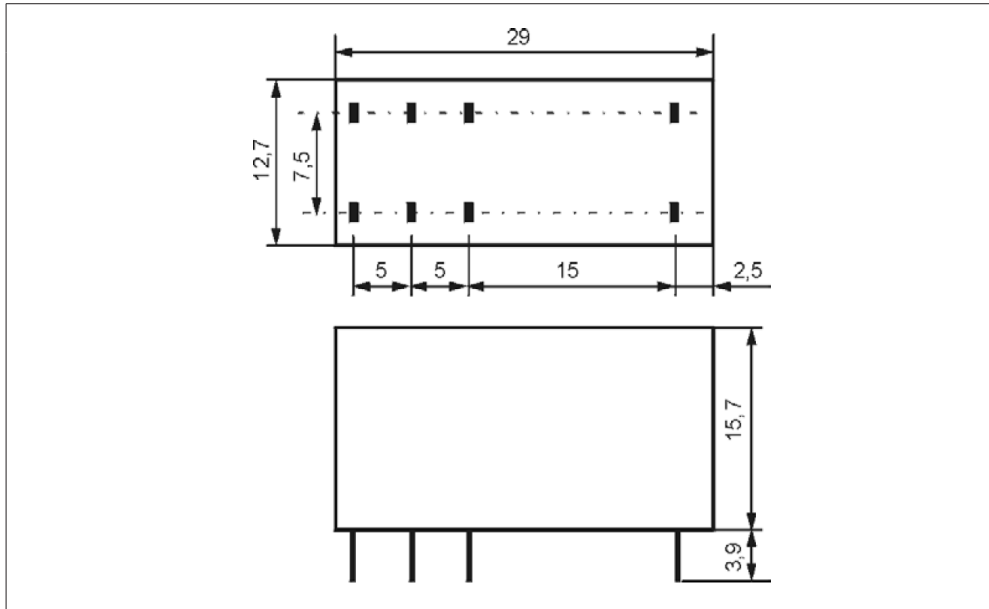
Storage temperature	-40 °C...+85 °C
Operating temperature	AC -40 °C...+70 °C DC -40 °C...+85 °C
Shock	S1: 30 g / S2: 20 g
Vibrations	5 g, 10-150 Hz
Environment protection	EN 116000-3: RTIII
Degree of protection	EN 60529: IP 40

Compliance

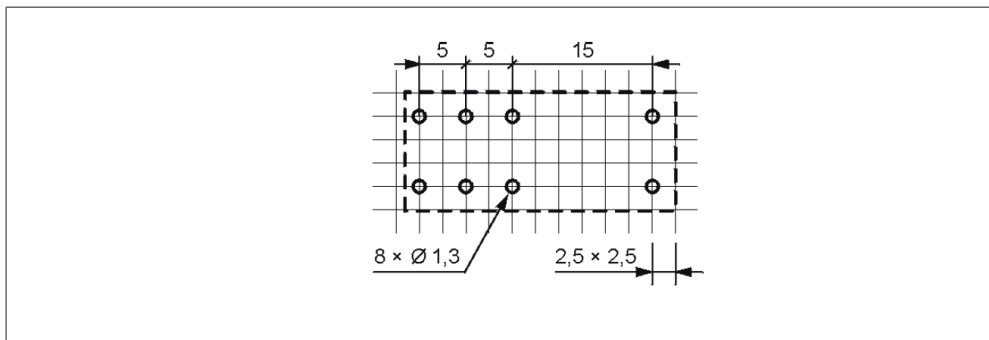
EEN 60335-1	Household and similar electrical appliances
EN 60255	Relay design and environmental conditions
EN 60947	Low voltage switch gear and control gear
EN 60947-5-1	Electromechanical control circuit devices and switching elements
IEC 61810	Electromechanical elementary relays
IEC 610810-1:2008	Low voltage directive 2006/95/EC
The relays meet the requirements of the RoHS directive	

Miniature relay
S-relay

Dimensions (mm)



Pin out (solder side view)



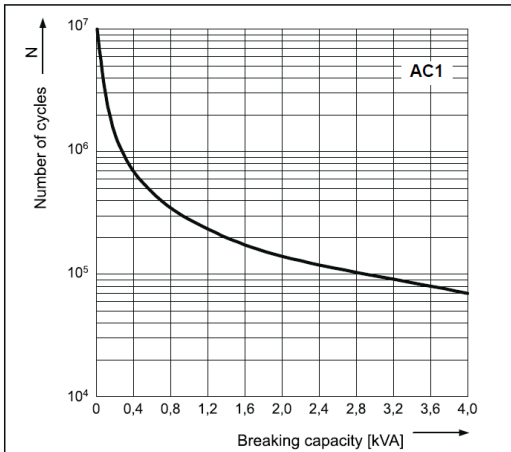
Miniature relay S-relay

Electrical life expectancy S1

The life expectancy values shown below are based on factory tests. These values could be different in real life applications as environmental conditions, switching frequencies and duty cycles will influence these values.

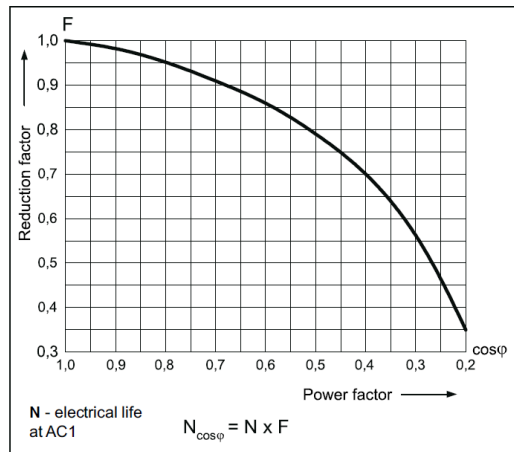
Electrical life at AC resistive load.
Switching frequency: 600 cycles/hour

Fig. 1



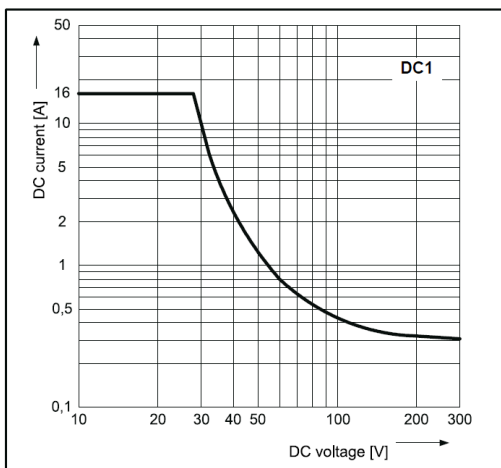
Electrical life reduction factor at AC inductive load

Fig. 2



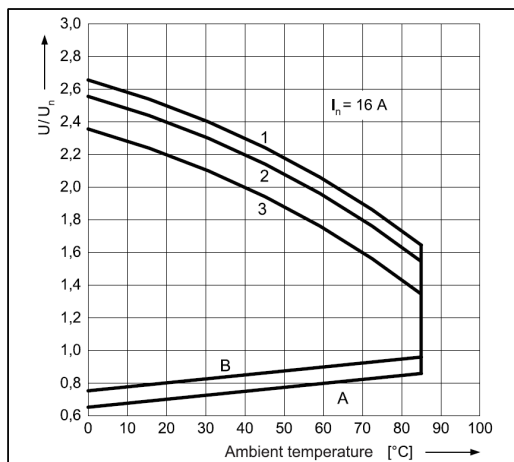
Max. DC resistive load breaking capacity

Fig. 3



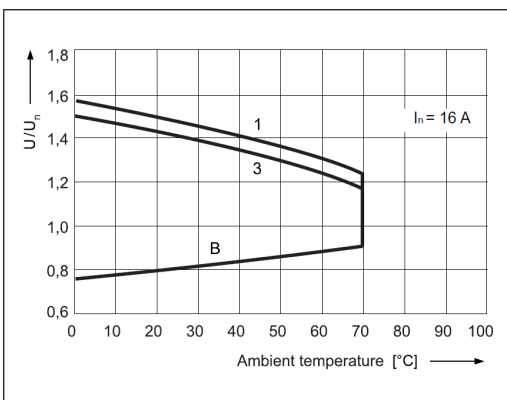
Coil operating range - DC

Fig. 4



Coil operating range - AC 50 Hz

Fig. 5

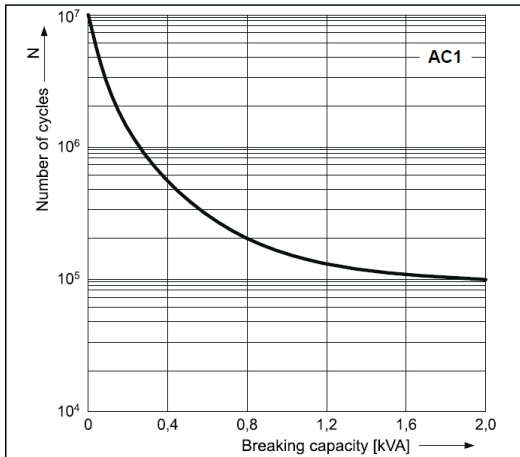


Miniature relay S-relay

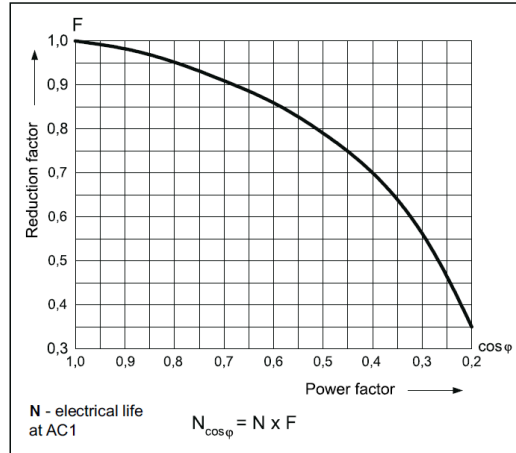
Electrical life expectancy S2

The life expectancy values shown below are based on factory tests. These values could be different in real life applications as environmental conditions, switching frequencies and duty cycles will influence these values.

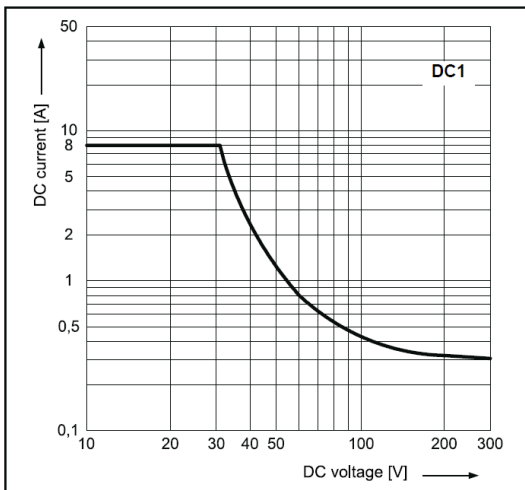
Electrical life at AC resistive load. Switching frequency: 600 cycles/hour Fig. 1



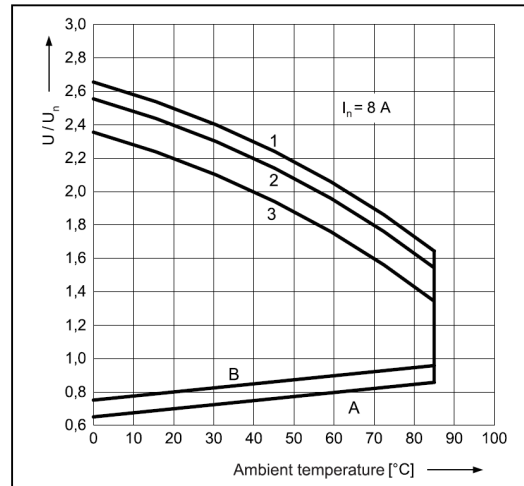
Electrical life reduction factor at AC inductive load Fig. 2



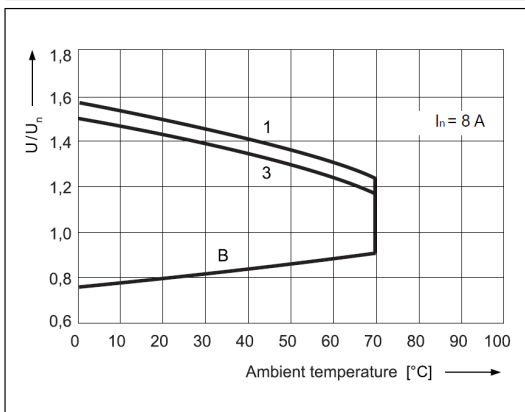
Max. DC resistive load breaking capacity Fig. 3



Coil operating range - DC Fig. 4




Coil operating range - AC 50 Hz Fig. 5



Miniature relay S-relay

Sockets

 <p>VS-2L</p>				
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Art. no.	Type	Weight (g)	Dimensions (mm)
321000559	Screw terminals	61	76.3 x 27 x 42.5

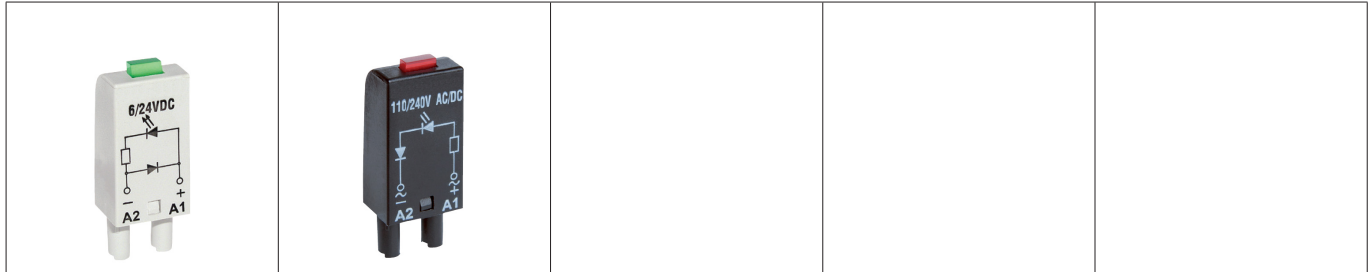
Accessories

 <p>MS-2L</p>	 <p>CS-1</p>	 <p>DPS-1</p>	 <p>S-connect-5</p>	
--------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------	--

Art. no.	Type	Applicable for	
321000560	MS-2L	Relay retaining clip, plastic	
321000563	CS-1	Relay retaining clip, metal	
321000564	DPS-1	Description plate	
321000562	S-connector-5	Interconnection strip	

Miniature relay S-relay

Accessories



Type	Schematic	Voltage	Art.no.	LED colour
DM-1 Limits overvoltage on DC coils	- A2 + A1	6...230 VDC	321000507	
DM-2 Limits overvoltage on DC coils	+ A2 - A1	6...230 VDC	321000524	
DLM-3R Limits overvoltage on DC coils Coil energizing indication	+ A2 - A1	6...24 VDC 24...60 VDC 110...230 VDC	321000525 321000526 321000527	Red Red Red
DLM-3G Limits overvoltage on DC coils Coil energizing indication		6...24 VDC 24...60 VDC 110...230 VDC	321000528 321000529 321000530	Green Green Green
DLM-4R Limits overvoltage on DC coils Coil energizing indication		- A2 + A1	6...24 VDC 24...60 VDC 110...230 VDC	321000531 321000532 321000533
DLM-4G Limits overvoltage on DC coils Coil energizing indication		6...24 VDC 24...60 VDC 110...230 VDC	321000534 321000535 321000536	Green Green Green
RCM-5 Limits overvoltage on AC and DC coils Coil energizing indication	A2 A1	6...24 VAC/DC 24...60 VAC/DC 110...230 VAC/DC	321000537 321000538 321000539	
LM-6R Limits overvoltage on AC and DC coils	≈ A2 ± A1	6...24 VAC/DC 24...60 VAC/DC 110...230 VAC/DCC	321000540 321000541 321000542	Red Red Red
LM-6G Limits overvoltage on AC and DC coils		6...24 VAC/DC 24...60 VAC/DC 110...230 VAC/DC	321000543 321000544 321000545	Green Green Green
LVM-7R Limits overvoltage on AC and DC coils Coil energizing indication		≈ A2 ± A1	6...24 VAC/DC 24...60 VAC/DC 110...230 VAC/DC	321000546 321000547 321000548
LVM-7G Limits overvoltage on AC and DC coils Coil energizing indication		6...24 VAC/DC 24...60 VAC/DC 110...230 VAC/DC	321000549 321000550 321000551	Green Green Green
VM-8 Limits overvoltage on AC coils No indication	A2 A1	6...24 VAC 110...130 VAC 110...240 VAC	321000552 321000553 321000554	
RM-9 Limits overvoltage on AC coils	A2 A1	110...240 VAC	321000555	

Miniature relay S-relay

Installation, operation, maintenance

Installation

- Install the socket and connect wiring according the identification on the terminals, plug the relay into the socket
- Reverse installation of socket is not possible due to mechanical blocking by pinning
- Do not reverse the polarity of the coilconnection when a diode is used
- Relays can be mounted tight next to each other
- Warning! Never use silicon near by relays!

Operation

- Before operate always apply voltage to coil to check correct operation
- Also switching the load a few times is advised
- Long term storage may corrode the silver on the relay pins
- By plugging the relay into the socket, the connector 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 does not appear 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 does not work, a short circuit of suppression diode is possible (The coil connection was reversed)
- If relay does not work after inspection, please replace the relay by a similar model

Miniature relay
S-relay

Ordering codes

S1-relays

S1-D012	12 VDC	321000751
S1-D024	24 VDC	321000752
S1-A230	230 VAC	321000759

S2-relays

S2-D012	12 VDC	321000771
S2-D024	24 VDC	321000772
S2-A230	230 VAC	321000779

Other voltages on request

Miniature relay
S-relay

Over 10 million Mors Smitt relays in use in rail transport applications worldwide!

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