



Compliant with
European standards
1a1b 16A/10A/8A polarized
power relays

DE RELAYS (ADE)

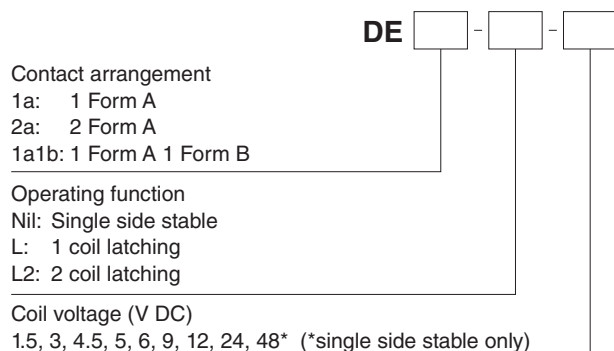
FEATURES

1. **Conforms to European safety standards (VDE0700 and VDE0631)**
Insulating distance between coil and contacts:
Clearance Min. 8mm .315 inch
Creepage distance Min. 8mm .315 inch
2. **Extensive product line-up**
3. **Surge voltage between contact and coil 12 kV**
- **Low operating power**
Nominal operating power at 200 mW
(Single side stable, 2 coil latching)
4. **Compact body saves space**
Size: 12.5(W) × 25.0(L) × 12.5(H) mm
.492(W) × .984(L) × .492(H) inch
5. **UL/CSA, VDE approved**

TYPICAL APPLICATIONS

- Temperature controller
- Automatic meter reading
- OA equipment
- FA equipment

ORDERING INFORMATION



Note: UL/CSA, VDE approved type is standard.

TYPES

Contact arrangement	Nominal coil voltage	Single side stable type	1 coil latching type	2 coil latching type
		Part No.	Part No.	Part No.
1 Form A	1.5V DC	DE1A1,5	DE1A-L-1,5V	DE1AL21,5
	3V DC	DE1A3	DE1AL3	DE1AL23
	4.5V DC	DE1A4,5	DE1AL4,5	DE1AL24,5
	5V DC	DE1A5	DE1AL5	DE1AL25
	6V DC	DE1A6	DE1AL6	DE1AL26
	9V DC	DE1A9	DE1AL9	DE1AL29
	12V DC	DE1A12	DE1AL12	DE1AL212
	24V DC	DE1A24	DE1AL24	DE1AL224
1 Form A 1 Form B	48V DC	DE1A48	DE1AL48	—
	1.5V DC	DE1A1B1,5	DE1A1BL1,5	DE1A1B-L2-1,5V
	3V DC	DE1A1B3	DE1A1BL3	DE1A1BL23
	4.5V DC	DE1A1B4,5	DE1A1BL4,5	DE1A1BL24,5
	5V DC	DE1A1B5	DE1A1BL5	DE1A1BL25
	6V DC	DE1A1B6	DE1A1BL6	DE1A1BL26
	9V DC	DE1A1B9	DE1A1BL9	DE1A1BL29
	12V DC	DE1A1B12	DE1A1BL12	DE1A1BL212
2 Form A	24V DC	DE1A1B24	DE1A1BL24	DE1A1BL224
	48V DC	DE1A1B48	DE1A1BL48	DE1A1BL218
	1.5V DC	DE2A-1,5V	DE2A-L-1,5V	DE2A-L2-1,5V
	3V DC	DE2A3	DE2AL3	DE2AL23
	4.5V DC	DE2A4,5	DE2AL4,5	DE2A-L2-4,5V
	5V DC	DE2A5	DE2AL5	DE2AL25
	6V DC	DE2A6	DE2A-L-6V	DE2AL26
	9V DC	DE2A	DE2AL9	DE2AL29
	12V DC	DE2A12	DE2AL12	DE2AL212
	18V DC	DE2A18	DE2AL18	DE2AL218
	24V DC	DE2A24	DE2AL24	DE2AL224
	48V DC	DE2A48	DE2AL48	DE2AL248

Standard packing: Tube package: 20 pcs.; Case: 500 pcs.

RATING

1. Coil data

1) Single side stable type

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power	Max. applied voltage (at 20°C 68°F)
1.5V DC	70%V or less of nominal voltage (Initial)	10%V or more of nominal voltage (Initial)	132.7mA	11.3Ω	200mW	130%V of nominal voltage
3V DC			66.6mA	45Ω		
4.5V DC			44.5mA	101Ω		
5V DC			40mA	125Ω		
6V DC			33.3mA	180Ω		
9V DC			22.2mA	405Ω		
12V DC			16.6mA	720Ω		
24V DC			8.3mA	2,880Ω		
48V DC			4.2mA	11,520Ω		

2) 1 coil latching type

Nominal coil voltage	Set voltage (at 20°C 68°F)	Reset voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power	Max. applied voltage (at 20°C 68°F)
1.5V DC	70%V or less of nominal voltage (Initial)	70%V or less of nominal voltage (Initial)	66.6mA	22.5Ω	100mW	130%V of nominal voltage
3V DC			33.3mA	90Ω		
4.5V DC			22.3mA	202Ω		
5V DC			20mA	250Ω		
6V DC			16.7mA	360Ω		
9V DC			11.1mA	812Ω		
12V DC			8.3mA	1,440Ω		
24V DC			4.2mA	5,760Ω		

3) 2 coil latching type

Nominal coil voltage	Set voltage (at 20°C 68°F)	Reset voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)		Coil resistance [±10%] (at 20°C 68°F)		Nominal operating power		Max. applied voltage (at 20°C 68°F)
			Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
1.5V DC	70%V or less of nominal voltage (Initial)	70%V or less of nominal voltage (Initial)	66.6mA	66.6mA	11.3Ω	11.3Ω	200mW	200mW	130%V of nominal voltage
3V DC			66.6mA	66.6mA	45Ω	45Ω			
4.5V DC			44.5mA	44.5mA	101Ω	101Ω			
5V DC			40mA	40mA	125Ω	125Ω			
6V DC			33.3mA	33.3mA	180Ω	180Ω			
9V DC			22.2mA	22.2mA	405Ω	405Ω			
12V DC			16.6mA	16.6mA	720Ω	720Ω			
24V DC			8.3mA	8.3mA	2,880Ω	2,880Ω			

2. Specifications

Characteristics	Item		Specifications		
Contact	Arrangement		1 Form A	1 Form A 1 Form B	2 Form A
	Contact resistance (Initial)		Max. 30 mΩ (By voltage drop 6 V DC 1A)		
	Contact material		AgSnO ₂ type		
Rating	Nominal switching capacity (resistive load)		10A 250V AC, 10A 30V DC	8A 250V AC, 8A 30V DC	
	Max. switching power (resistive load)		2,500VA*4, 300W	2,000VA*4, 240W	
	Max. switching voltage		440V AC, 230V DC	440V AC, 230V DC	
	Max. switching current		10A (16A)*4	8A (16A)*4	
	Nominal operating power		Single side stable, 2 coil latching: 200mW; 1 coil latching: 100mW		
	Min. switching capacity*1		100mA 5V DC		
Electrical characteristics	Insulation resistance (Initial)		Min. 1,000MΩ (at 500V DC) Measurement at same location as “Breakdown voltage” section.		
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1 min. (Detection current: 10 mA)		
		Between contact sets	—	4,000 Vrms for 1 min. (Detection current: 10 mA)	
		Between contact and coil	5,000 Vrms for 1 min. (Detection current: 10 mA)		
	Surge breakdown voltage*2 (Between contact and coil) (Initial)		12,000 V		
	Temperature rise (coil) (at 70°C 158°F)		Max. 50°C 122°F (By resistive method)		
	Operate time [Set time] (at 20°C 68°F)		Max. 10 ms (typ. 5ms) Max. 10 ms (typ. 4ms) (Nominal coil voltage applied to the coil, excluding contact bounce time.)		
	Release time [Reset time] (at 20°C 68°F)		Max. 5 ms (typ. 2ms) Max. 10 ms (typ. 4ms) (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode)		
Mechanical characteristics	Shock resistance	Functional	Min. 196 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)		
		Destructive	Min. 980 m/s ² (Half-wave pulse of sine wave: 6 ms.)		
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 2 mm (Detection time: 10μs.)		
		Destructive	10 to 55 Hz at double amplitude of 3 mm		
Expected life	Mechanical		Min. 10 ⁷ (at 300 times/min.)		
	Electrical		Min. 10 ⁵ (resistive load, at 20 times/min., at nominal switching capacity)		Min. 10 ⁵ (resistive load, at 20 times/min., at AC nominal switching capacity) Min. 5×10 ⁴ (resistive load, at 20 times/min., at DC nominal switching capacity)
		Electrical (16A/230V AC resistive)*4		25000	2000
Conditions	Conditions for operation, transport and storage*3		Ambient temperature: -40°C to +70°C -40°F to +158°F; Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)		
	Max. operating speed		20 times/min. (at nominal switching capacity)		
Unit weight			Approx. 7 g .25 oz		

Notes:

*1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

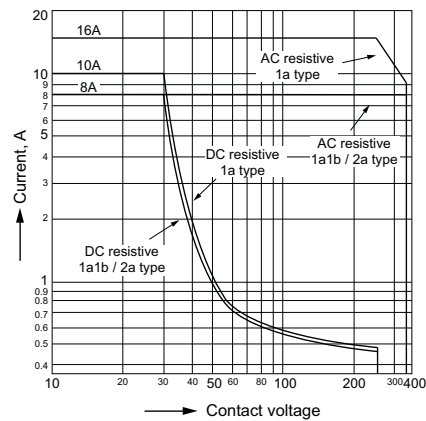
*2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981

*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to "6. Usage, Storage and Transport Conditions" in [AMBIENT ENVIRONMENT section in Relay Technical Information](#).

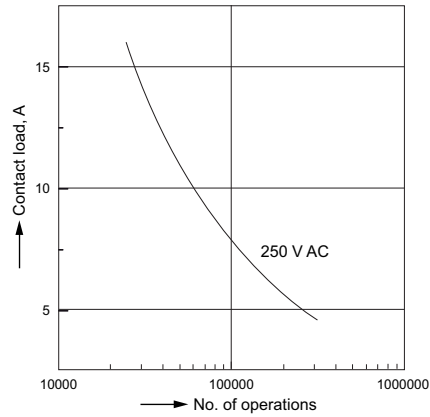
*4. 16A possible for one contact set only with max. 4000VA switching power.

REFERENCE DATA

1. Max. switching power

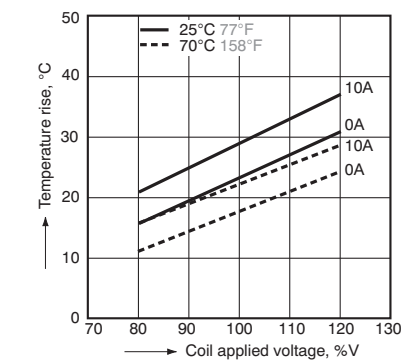


2. Life curve



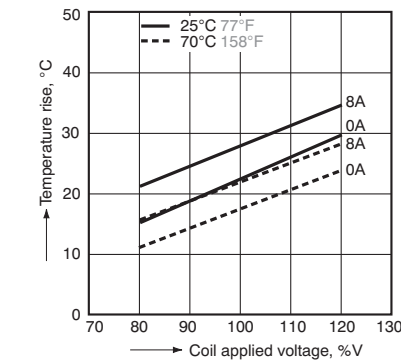
3.-(1) Coil temperature rise (1 Form A)

Tested sample: ADE109
Quantity: n=6
Ambient temperature: 25°C to 70°C 77°F to 158°F



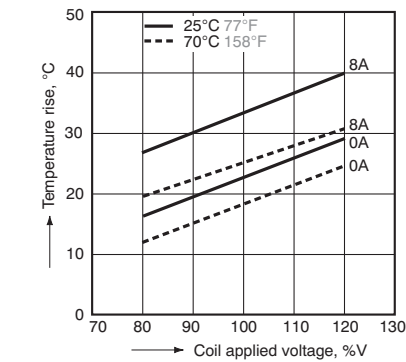
3.-(2) Coil temperature rise (1 Form A 1 Form B)

Tested sample: ADE309
Quantity: n=6
Ambient temperature: 25°C to 70°C 77°F to 158°F



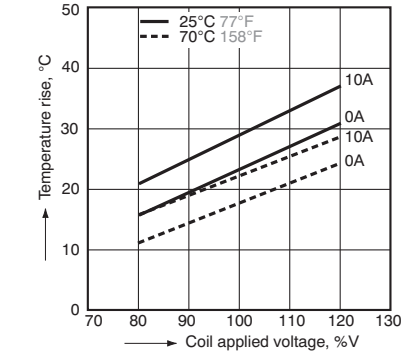
3.-(3) Coil temperature rise (2 Form A)

Tested sample: ADE209
Quantity: n=6
Ambient temperature: 25°C to 70°C 77°F to 158°F



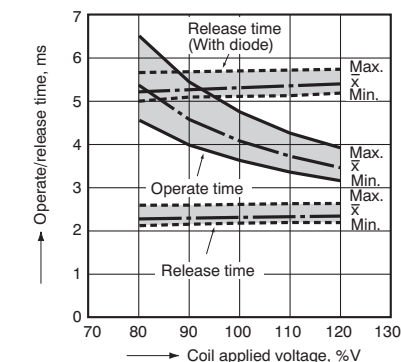
4-1. Operate/release time (1 Form A)

Tested sample: DE1a-5V
Quantity: n=5



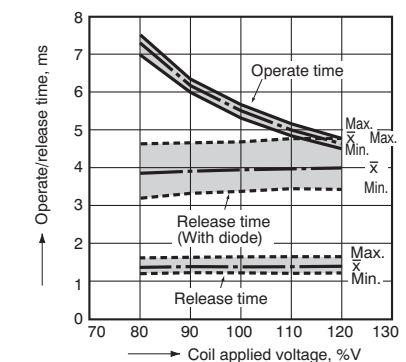
4-2. Operate/release time (1 Form A 1 Form B)

Tested sample: DE1a1b-5V, Quantity: n=5



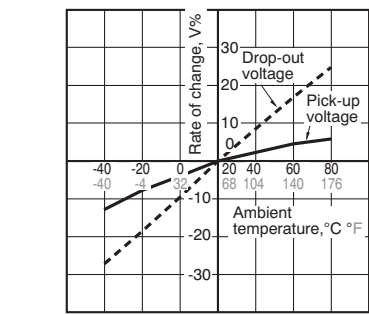
4-3. Operate/release time (2 Form A)

Tested sample: DE2a-5V, Quantity: n=5



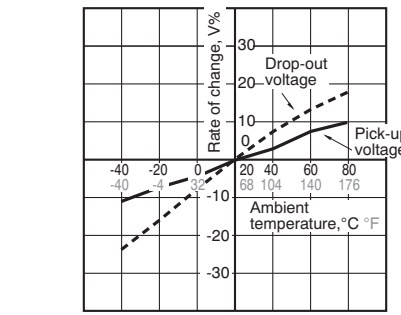
5-1. Ambient temperature characteristics (1 Form A)

Tested sample: DE1a-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



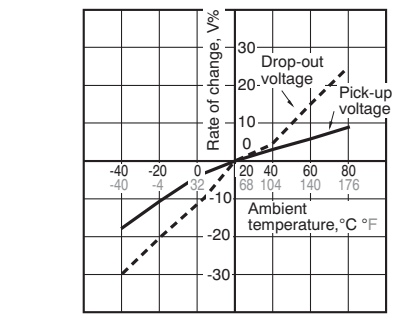
5-2. Ambient temperature characteristics (1 Form A 1 Form B)

Tested sample: DE1a1b-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6

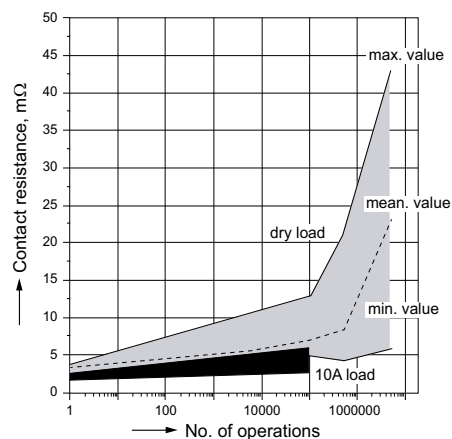


5-3. Ambient temperature characteristics (2 Form A)

Tested sample: DE2a-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



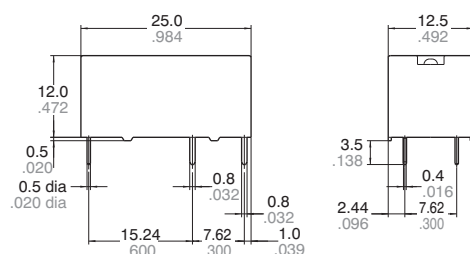
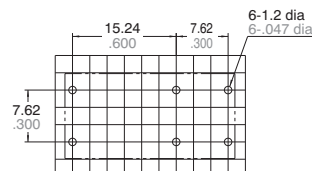
6. Change of contact resistance



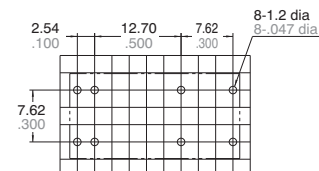
DIMENSIONS(mm inch)

Download [CAD Data](#) from our Web site.

CAD Data

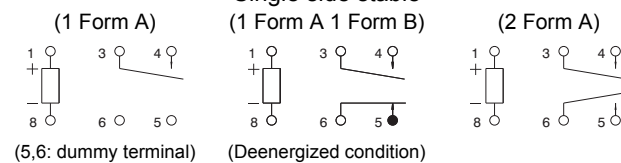
Single side stable
1 coil latching typeSingle side stable
1 coil latching type

2 coil latching type

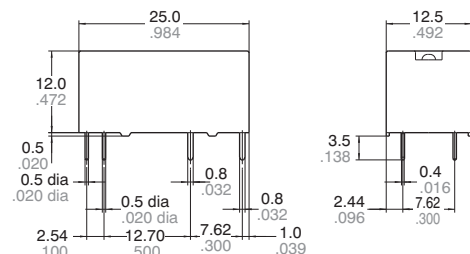
Tolerance : $\pm 0.1 \pm .004$

Schematic (Bottom view)

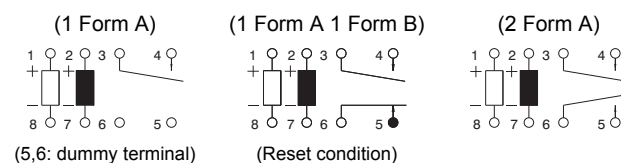
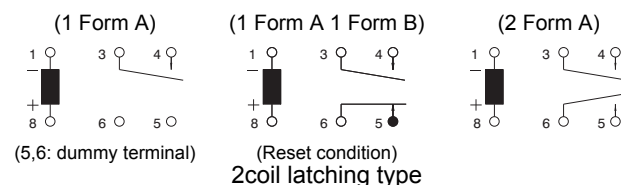
Single side stable



2 coil latching type

Tolerance: $\pm 0.3 \pm .012$

PC board pattern (Bottom view)



SAFETY STANDARDS

Item	UL/C-UL (Recognized)		CSA (Certified)		VDE (Certified)	
	File No.	Contact rating	File No.	Contact rating	File No.	Contact rating
1 Form A	E120782	PILOT DUTY B300 R300	LR85932	PILOT DUTY B300 R300	115944	8A 250V AC (cosφ=1.0)
1 Form A 1 Form B	E120782	PILOT DUTY B300 R300	LR85932	PILOT DUTY B300 R300	115944	8A 250V AC (cosφ=1.0)
2 Form A	E120782	PILOT DUTY B300 R300	LR85932	PILOT DUTY B300 R300	115944	8A 250V AC (cosφ=1.0)

For Cautions for Use, see [Relay Technical Information](#).