



ideas for life



DK RELAYS



RoHS compliant

FEATURES

- 1. Compact with high capacity High capacity switching in a small package: 1 Form A, 10 A 250 V AC; 1 Form A 1 Form B and 2 Form A, 8 A 250 V AC.
- 2. High sensitivity: 200 mW nominal operating power
- 3. High breakdown voltage Independent coil and the contact structure improves breakdown voltage.

Between contact and coil	Between open contacts
4,000 Vrms for 1 min.	1,000 Vrms for 1 min.
10,000 V surge	1,500 V surge
breakdown voltage	breakdown voltage

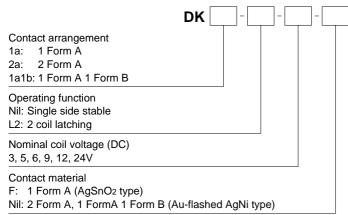
Conforms with FCC Part 68

- 4. Latching types available
- 5. Sealed construction allows automatic washing.
- 6. Sockets are available
- 7. Complies with safety standards Complies with Japan Electrical Appliance and Material Safety Law requirements for operating 200 V power supply circuits, and complies with UL, CSA, and TÜV safety standards.

TYPICAL APPLICATIONS

- 1. Switching power supply
- 2. Power switching for various **OA** equipment
- 3. Control or driving relays for industrial machines (robotics, numerical control machines, etc.)
- 4. Output relays for programmable logic controllers, temperature controllers, timers and so on.
- 5. Home appliances

ORDERING INFORMATION



Notes: 1. Certified by UL, CSA and TÜV 2. VDE approved type is available.

TYPES

Contact	Nominal coil	Single side stable	2 coil latching			
arrangement	voltage	Part No.	Part No.			
	3V DC	DK1a-3V-F	DK1a-L2-3V-F			
	5V DC	DK1a-5V-F	DK1a-L2-5V-F			
1 Form A	6V DC	DK1a-6V-F	DK1a-L2-6V-F			
I FOIII A	9V DC	DK1a-9V-F	DK1a-L2-9V-F			
	12V DC	DK1a-12V-F	DK1a-L2-12V-F			
	24V DC	DK1a-24V-F	DK1a-L2-24V-F			
	3V DC	DK1a1b-3V	DK1a1b-L2-3V			
	5V DC	DK1a1b-5V	DK1a1b-L2-5V			
1 Form A	6V DC	DK1a1b-6V	DK1a1b-L2-6V			
1 Form B	9V DC	DK1a1b-9V	DK1a1b-L2-9V			
	12V DC	DK1a1b-12V	DK1a1b-L2-12V			
	24V DC	DK1a1b-24V	DK1a1b-L2-24V			
	3V DC	DK2a-3V	DK2a-L2-3V			
	5V DC	DK2a-5V	DK2a-L2-5V			
2 Form A	6V DC	DK2a-6V	DK2a-L2-6V			
∠ Form A	9V DC	DK2a-9V	DK2a-L2-9V			
	12V DC	DK2a-12V	DK2a-L2-12V			
	24V DC	DK2a-24V	DK2a-L2-24V			

Standard packing: Carton: 50 pcs.; Case: 500 pcs.

RATING

1. Coil data

1) Single side stable

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)
3V DC	70%V or less of nominal voltage (Initial)	10%V or more of nominal voltage (Initial)	66.6mA	45Ω		130%V of nominal voltage
5V DC			40mA	125Ω		
6V DC			33.3mA	180Ω	200mW	
9V DC			22.2mA	405Ω	20011100	
12V DC			16.6mA	720Ω		
24V DC			8.3mA	2,880Ω		

2) 2 coil latching

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	
3V DC	70%V or less of nominal voltage (Initial)	70%V or less of nominal voltage (Initial)	66.6mA	66.6mA	45Ω	45Ω	200mW	200mW	130%V of nominal voltage
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			

^{*} For sockets, see page 123.

DK

2. Specifications

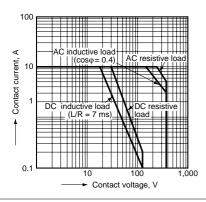
<u> </u>		Tr.		0 10 11				
Characteristics		Item	Specifications					
	Arrangement		1 Form A	1 Form A 1 Form B 2 Form				
Contact	Contact resistance (Initial)		Max. 30 mΩ (By voltage drop 6 V DC 1A)					
	Contact material		Au-flashed AgSnO ₂ type Au-flashed AgNi type					
	Nominal switching ca	apacity (resistive load)	10 A 250 V AC, 10 A 30 V DC	8 A 250 V AC,8 A 30 V DC	8 A 250 V AC,8 A 30 V DC			
	Max. switching power (resistive load)		2,500VA, 300 W	2,000 VA, 240 W	2,000 VA, 240 W			
Rating	Max. switching voltage		250 V AC, 125 V DC	250 V AC, 125 V DC	250 V AC, 125 V DC			
Rating	Max. switching currer	nt	10 A	8 A	8 A			
	Nominal operating power			200 mW				
	Min. switching capac	ity (Reference value)*1		10m A 5 V DC				
	Insulation resistance	(Initial)	Min. 1,000MΩ (at 500V DC) M	Min. 1,000M Ω (at 500V DC) Measurement at same location as "Breakdown voltage" section				
	Breakdown voltage	Between open contacts	1,000 Vr	1,000 Vrms for 1min. (Detection current: 10mA.)				
	(Initial)	Between contact and coil	4,000 Vrms for 1min. (Detection current: 10mA.)					
Electrical	Surge breakdown voltage*2 (Initial) between contacts and coil		10,000 V					
characteristics	Temperature rise (co	il) (at 65°C 149°F)	Max. 40°C (By resistive metho	od, nominal voltage applied to the	ne coil; max. switching current)			
	Operate time [Set time] (at 20°C 68°F)		Max. 10 ms (Approx. 5 ms) [10 ms (Approx. 5 ms)] (Nominal coil voltage applied to the coil, excluding contact bounce time.)					
	Release time [Reset	time] (at 20°C 68°F)	Max. 8 ms (Approx. 3 ms) [10 ms (Approx. 3 ms)] (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode)					
	Shock resistance	Functional	Min. 98 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)					
Mechanical	Shock resistance	Destructive	Min. 980 m/s ² (Half-wave pulse of sine wave: 6 ms.)					
characteristics	\mu_1 \dots	Functional	10 to 55 Hz at double amplitude of 1.5 mm (Detection time: 10μs.)					
	Vibration resistance	Destructive	10 to 55 Hz at double amplitude of 3 mm					
Francisco de 1865	Mechanical		Min. 5×10 ⁷ (at 300 times/min.)					
Expected life	Electrical		Min. 10 ⁵ (resistive load, at 20 times/min., at rated capacity)					
Conditions	Conditions for operation, transport and storage*3		Ambient temperature: -40°C to +65°C -40°F to +149°F, Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)					
	Max. operating speed (at rated load)		20 times/min.					
Unit weight			Approx. 5 g .18 oz	Approx. 6 g .21 oz	Approx. 6 g .21 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.

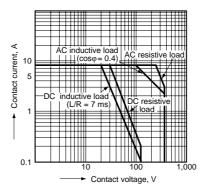
*2. Wave is standard shock voltage of $\pm 1.2 \times 50 \mu s$ according to JEC-212-1981

REFERENCE DATA

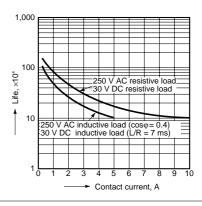
1-(1). Maximum operating power (1 Form A)



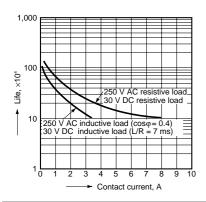
1-(2). Maximum operating power (1 Form A 1 Form B, 2 Form A)



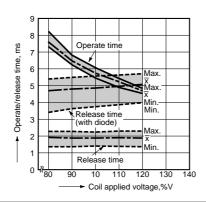
2-(1). Life curve (1 Form A)



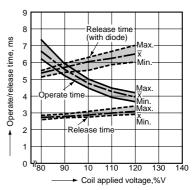
2-(2). Life curve (1 Form A 1 Form B, 2 Form A)



3-(1). Operate/Release time (1 Form A) Tested sample: DK1a-24V, 5 pcs.

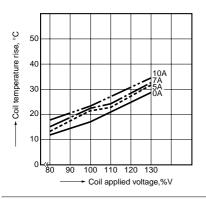


3-(2). Operate/Release time (1 Form A 1 Form B, 2 Form A) Tested sample: DK1a1b-12V, 5 pcs.

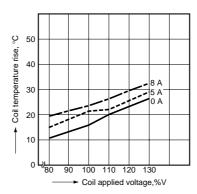


^{*3.} The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

4-(1). Coil temperature rise (1 Form A) Tested sample: DK1a-12V, 5 pcs. Ambient temperature: 30°C 86°F



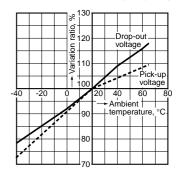
4-(2). Coil temperature rise (1 Form A 1 Form B, 2 Form A) Tested sample: DK1a1b-12V, 5 pcs. Ambient temperature: 20°C 68°



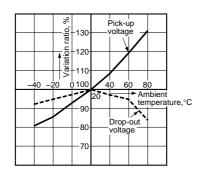
5-(1). Ambient temperature characteristics (1 Form A)

Tested sample: DK1a-24V, 6 pcs

Ambient temperature: –40°C to +80°C -40°F to +176°F



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



DIMENSIONS (mm inch)

The CAD data of the products with a CAD Data mark can be downloaded from: http://industrial.panasonic.com/ac/e/

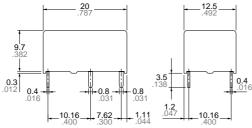
1. 1 Form A type

CAD Data

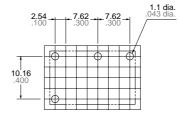


External dimensions

Single side stable type



PC board pattern (Bottom view)

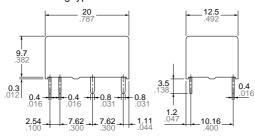


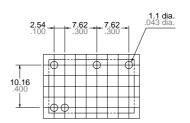
Schematic (Bottom view) Single side stable



(Deenergized condition)

2 coil latching type





2 coil latching



(Reset condition)

Since this is a polarized relay, the connection to the coil should be done according to the above schematic.

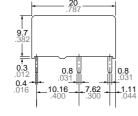
2. 1 Form A 1 Form B type, 2 Form A type

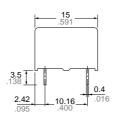
CAD Data

External dimensions

Single side stable type

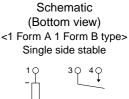






PC board pattern (Bottom view)





(Deenergized condition) 2 coil latching



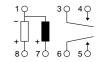
(Reset condition)

<2 Form A> Single side stable



(Deenergized condition)

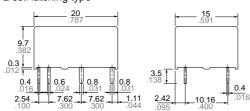
2 coil latching



(Reset condition)

Since this is a polarized relay, the connection to the coil should be done according to the above schematic.

2 coil latching type



General tolerance: ±0.3 ±.012

Tolerance: ±0.1 ±.004

SAFETY STANDARDS

Item	UL/C-UL (Recognized)		CSA (Certified)		VDE (Certified)		TÜV (Certified)	
item	File No.	Contact rating	File No.	Contact rating	File No.	Contact rating	File No.	Rating
1 Form A	E43028	10A 250V AC 1/3HP 125, 250V AC 10A 30V DC	LR26550 etc.	10A 250V AC 1/3HP 125, 250V AC 10A 30V DC	006099UG	AC 250V 10A (cosφ=1.0) AC 250V 5A (cosφ=0.4) DC 30V 10A (0ms)	8705 1645 520	10A 250V AC (cosφ=1.0) 5A 250V AC (cosφ=0.4) 10A 30V DC
1 Form A 1 Form B, 2 Form A	E43028	8A 250V AC 1/4HP 125, 250V AC 8A 30V DC	LR26550 etc.	8A 250V AC 1/4HP 125, 250V AC 8A 30V DC	006099UG	1 Form A 1 Form B: AC 250V 8A ($\cos\phi$ =1.0) 2 Form A: AC 250V 8A ($\cos\phi$ =1.0) AC 250V 4A ($\cos\phi$ =0.4)	8705 1645 520 (1 Form A 1 Form B) 9407 13461 097 (2 Form A)	8A 250V AC (cosφ=1.0) 4A 250V AC (cosφ=0.4) 8A 30V DC

NOTES

1. Soldering should be done under the following conditions:

250°C 482°F within 10s 300°C 572°F within 5s 350°C 662°F within 3s

Soldering depth: 2/3 terminal pitch

2. External magnetic field

Since DK relays are highly sensitive polarized relays, their characteristics will be affected by a strong external magnetic field. Avoid using the relay under that condition.

3. When using, please be aware that the a contact and b contact sides of 1 Form A and 1 Form B types may go on simultaneously at operate time and release time.

For Cautions for Use.