

Product Change Notice: DK & DY Relay Material Change

PCN.PG03.1.17.2023

1.17.2023

About This Notice:

Due to discontinuation of card molding materials, the card material for the DK and DY Series Power Relays will be changed.

Effective Date:

From September 2023 production.

Change Details:

Due to discontinuation of card molding material, the card material will change to LCP.

Reason	Product name (Type)	Current	Change
Discontinuation of card molding material	DK relays (2 Form A, 1 Form A 1 Form B)	PPS	LCP
	DY relays (1 Form A, 1 Form A 1 Form B)	PPS	
Unification of card molding material	DK relays (1 Form A)	PES	

Affected Parts:

All DK and DY series relays, including custom products. See attached part number list.

Datasheet(s):

See attached

Notes:

Part numbers, pricing, and specifications remain unchanged

Panasonic PCN.PG03.1.17.2023 DK and DY Affected Parts

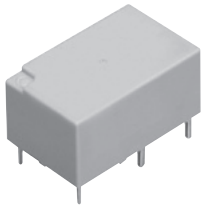
Affected Part Numbers	Affected Series
ADY10003	DY
ADY10005	DY
ADY10006	DY
ADY10009	DY
ADY10012	DY
ADY10024	DY
ADY12003	DY
ADY12005	DY
ADY12006	DY
ADY12009	DY
ADY12012	DY
ADY12024	DY
ADY30003	DY
ADY30005	DY
ADY30006	DY
ADY30009	DY
ADY30012	DY
ADY30024	DY
ADY32003	DY
ADY32005	DY
ADY32006	DY
ADY32009	DY
ADY32012	DY
ADY32024	DY
DK1A-12V-F	DK
DK1A1B-12V	DK
DK1A1B-24V	DK
DK1A1B-3V	DK
DK1A1B-5V	DK
DK1A1B-6V	DK
DK1A1B-9V	DK
DK1A1B-L2-12V	DK
DK1A1B-L2-24V	DK
DK1A1B-L2-3V	DK
DK1A1B-L2-5V	DK
DK1A1B-L2-6V	DK
DK1A1B-L2-9V	DK
DK1A-24V-F	DK
DK1A-24V-F-Y4	DK
DK1A-3V-F	DK
DK1A-5V-F	DK
DK1A-6V-F	DK

DK1A-9V-F	DK
DK1A-L2-12V-F	DK
DK1A-L2-24V-F	DK
DK1A-L2-3V-F	DK
DK1A-L2-5V-F	DK
DK1A-L2-6V-F	DK
DK1A-L2-9V-F	DK
DK1A-L-5V-F	DK
DK2A-12V	DK
DK2A-24V	DK
DK2A-3V	DK
DK2A-5V	DK
DK2A-6V	DK
DK2A-9V	DK
DK2A-L2-12V	DK
DK2A-L2-24V	DK
DK2A-L2-3V	DK
DK2A-L2-5V	DK
DK2A-L2-6V	DK
DK2A-L2-9V	DK



1a 10A, 1a1b/2a 8A small polarized power relays

DK RELAYS



Protective construction: Sealed type

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. 10,000 V surge breakdown voltage	1,000 Vrms for 1 min. 1,500 V surge 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

DK - - -

Contact arrangement

- 1a: 1 Form A
- 2a: 2 Form A
- 1a1b: 1 Form A 1 Form B

Operating function

- Nil: Single side stable
- L2: 2 coil latching

Nominal coil voltage (DC)

3, 5, 6, 9, 12, 24V

Contact material

- F: 1 Form A (Au-flashed AgSnO₂ type)
- Nil: 2 Form A, 1 Form A 1 Form B (Au-flashed AgNi type)

Note: VDE approved type is available.

TYPES

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

* Sockets available.

RATING

1. Coil data

- Operating characteristics such as 'Operate voltage' and 'Release voltage' are influenced by mounting conditions, ambient temperature, etc. Therefore, please use the relay within $\pm 5\%$ of rated coil voltage.
- 'Initial' means the condition of products at the time of delivery.

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 [$\pm 10\%$] (at 20°C 68°F)	Coil resistance [$\pm 10\%$] (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	200mW	130%V of nominal voltage
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		

2) 2 coil latching type

Nominal coil voltage	Set voltage (at 20°C 68°F)	Reset voltage (at 20°C 68°F)	Nominal operating current [$\pm 10\%$] (at 20°C 68°F)		Coil resistance [$\pm 10\%$] (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			40 mA	40 mA	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		
		1 Form A	1 Form A 1 Form B	2 Form A
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	Au-flashed AgSnO ₂ type Au-flashed AgNi type		
Rating	Nominal switching capacity (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
	Max. switching voltage	250 V AC, 125 V DC (0.2A)	250 V AC, 125 V DC (0.2A)	250 V AC, 125 V DC (0.2A)
	Max. switching current	10 A	8 A	8 A
	Min. switching capacity (Reference value)*1	10m A 5 V 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 1min. (Detection current: 10mA.)	
		Between contact and coil	4,000 Vrms for 1min. (Detection current: 10mA.)	
	Surge breakdown voltage*2 (Initial)	between contacts and coil	10,000 V	
	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)			
Mechanical characteristics	Shock resistance	Functional	Min. 98 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 1.5 mm (Detection time: 10μs.)	
		Destructive	10 to 55 Hz at double amplitude of 3 mm	
Expected life	Mechanical	Min. 5×10 ⁷ (at 300 times/min.)		
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)		
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 ±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 Usage, transport and storage conditions in NOTES.

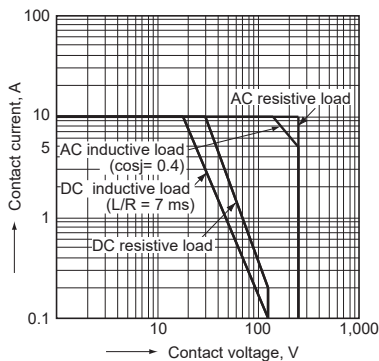
3. Electrical life

Condition: Resistive load, at 20 times/min.

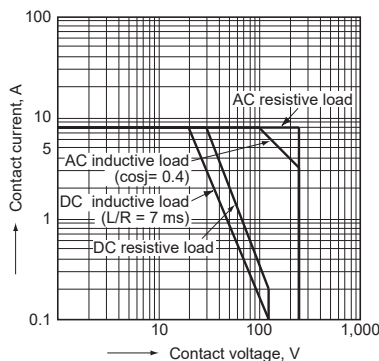
Type	Switching capacity	Number of operations
1 Form A	10A 250V AC 10A 30V DC	Min. 1×10 ⁶
1 Form A 1 Form B, 2 Form A	8A 250V AC 8A 30V DC	Min. 1×10 ⁶

REFERENCE DATA

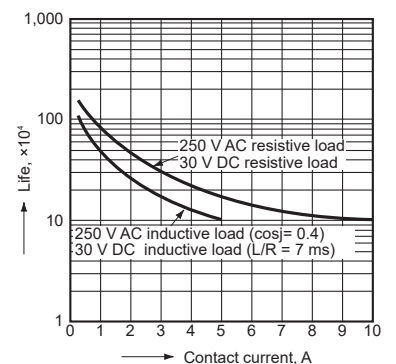
1-(1). Maximum operating power (1 Form A)



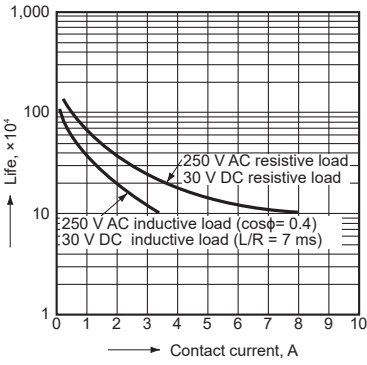
1-(2). Maximum operating power (1 Form A 1 Form B, 2 Form A)



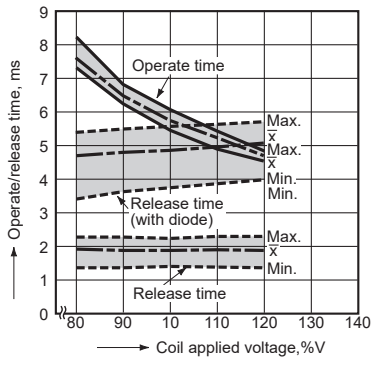
2-(1). Life curve (1 Form A)



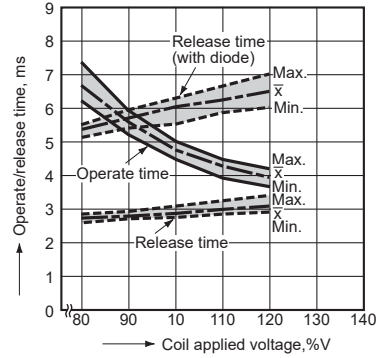
2-(2). Life curve
(1 Form A 1 Form B, 2 Form A)



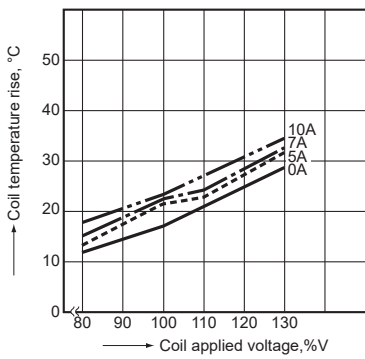
3-(1). Operate/Release time (1 Form A)
Tested sample: DK1a-24V, 5 pcs.



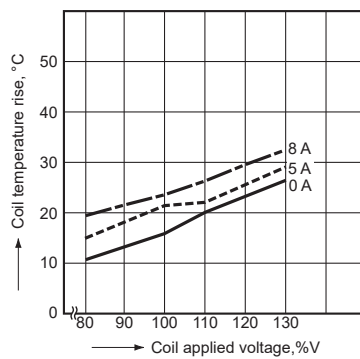
3-(2). Operate/Release time
(1 Form A 1 Form B, 2 Form A)
Tested sample: DK1a1b-12V, 5 pcs.



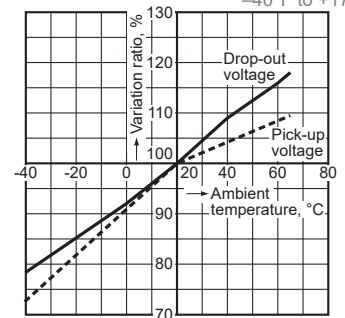
4-(1). Coil temperature rise (1 Form A)
Tested sample: DK1a-12V, 5 pcs.
Ambient temperature: 30°C 86°F



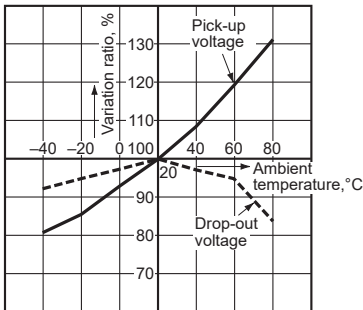
4-(2). Coil temperature rise
(1 Form A 1 Form B, 2 Form A)
Tested sample: DK1a1b-12V, 5 pcs.
Ambient temperature: 20°C 68°F



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)

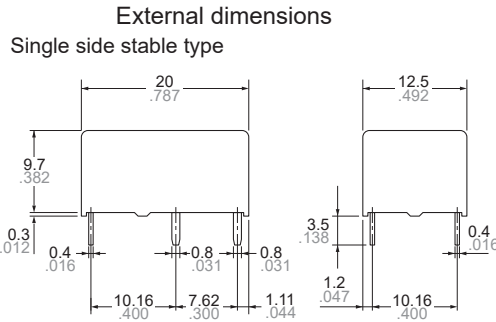
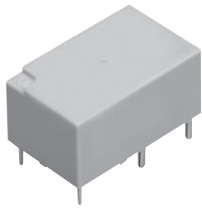


DIMENSIONS (mm inch)

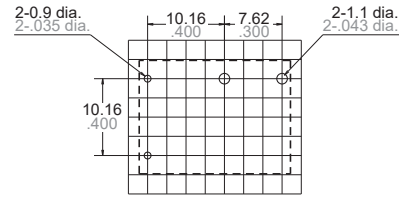
CAD The CAD data of the products with a "CAD" mark can be downloaded from our Website.

1. 1 Form A type

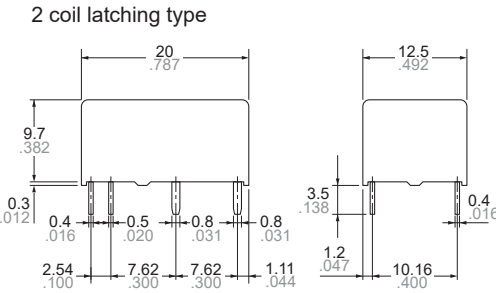
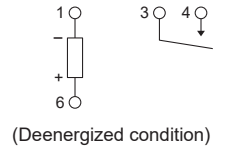
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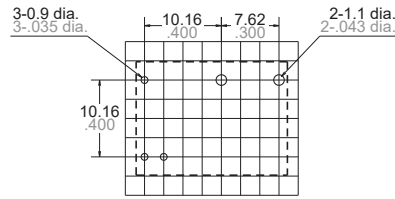
PC board pattern (Bottom view)
Single side stable type



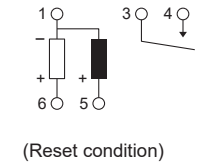
Schematic (Bottom view)
Single side stable type



2 coil latching type



2 coil latching type



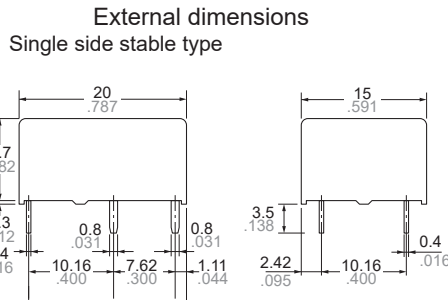
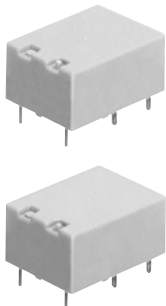
General tolerance: $\pm 0.3 \pm .012$

Tolerance: $\pm 0.1 \pm .004$

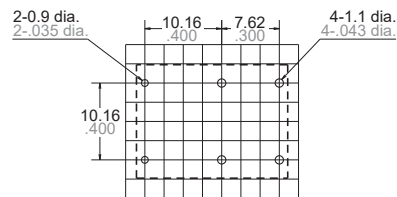
Since this is a polarized relay, the connection to the coil should be done according to the above schematic.

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

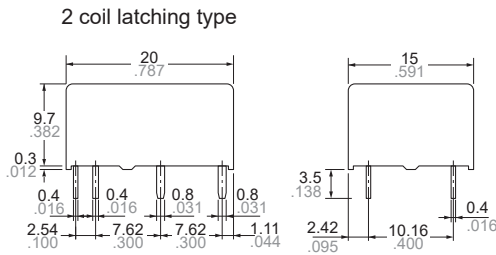
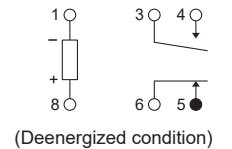
CAD



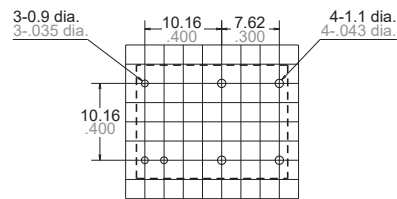
PC board pattern (Bottom view)
Single side stable type



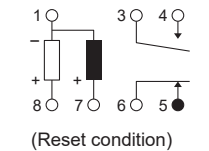
Schematic (Bottom view)
<1 Form A 1 Form B type>
Single side stable type



2 coil latching type



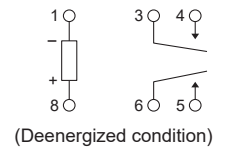
2 coil latching type



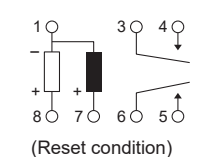
General tolerance: $\pm 0.3 \pm .012$

Tolerance: $\pm 0.1 \pm .004$

<2 Form A>
Single side stable type



2 coil latching type



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

SAFETY STANDARDS

Type	UL/C-UL (Recognized)		CSA (Certified)		TÜV (Certified)	
	File No.	Rating	File No.	Rating	File No.	Rating
1 Form A	E43028	10A 250V AC	LR26550	10A 250V AC	B 12 06 13461 329	10A 250V AC (cosφ =1.0)
		10A 30V DC		10A 30V DC		10A 30V DC (0ms)
		1/3HP 125, 250V AC		1/3HP 125, 250V AC		5A 250V AC (cosφ =0.4)
1 Form A 1 Form B, 2 Form A	E43028	8A 250V AC	LR26550	8A 250V AC	B 12 06 13461 329	8A 250V AC (cosφ =1.0)
		8A 30V DC		8A 30V DC		8A 30V DC (0ms)
		1/4HP 125, 250V AC		1/4HP 125, 250V AC		4A 250V AC (cosφ =0.4)

Notes: VDE approved type is available. Please contact our company.

INSULATION CHARACTERISTICS (IEC61810-1)

Item	Characteristics
Clearance/Creepage distance (IEC61810-1)	Min. 5.5/5.5mm
Category of protection (IEC61810-1)	RT III
Tracking resistance (IEC60112)	PTI 175
Insulation material group	III a
Over voltage category	III
Rated voltage	250V
Pollution degree	2
Type of insulation (Between contact and coil)	Reinforced insulation
Type of insulation (Between open contacts)	Micro disconnection

Notes: 1. EN/IEC VDE Certified.

2. VDE approved type only.

NOTES

1. For cautions for use, please read "GENERAL APPLICATION GUIDELINES".

2. Soldering should be done under the following conditions:

1) Preheating: Within 120°C 248°F and within 120 seconds

2) Soldering iron: 260°C±5°C

500°F±41°F and within 6 seconds

3. 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.

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

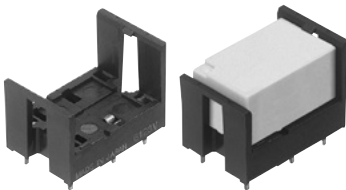
Please refer to "**the latest product specifications**" when designing your product.

• Requests to customers :

<https://industrial.panasonic.com/ac/e/salespolicies/>

ACCESSORIES

DK RELAYS PC BOARD SOCKET



TYPES

Type		Part No.
1 Form A	Single side stable	DK1a-PS
	2 coil latching	DK1a-PSL2
1 Form A 1 Form B, 2 Form A	Single side stable	DK2a-PS
	2 coil latching	DK2a-PSL2

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

RELAY COMPATIBILITY

Relay	Socket	1 Form A		1 Form A 1 Form B, 2 Form A	
		Single side stable type	2 coil latching type	Single side stable type	2 coil latching type
1 Form A	Single side stable type	●	●	—	—
	2 coil latching type	—	●	—	—
1 Form A 1 Form B, 2 Form A	Single side stable type	—	—	●	●
	2 coil latching type	—	—	—	●

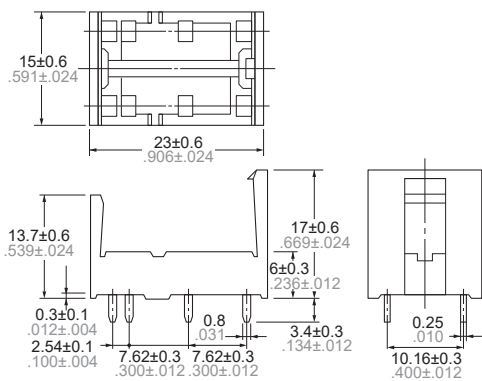
SPECIFICATIONS

Item	Specifications
Breakdown voltage (Initial)	4,000 Vrms (Detection current: 10 mA) (Except the portion between coil terminals)
Insulation resistance (Initial)	Min. 1,000 mΩ (at 500 V DC)
Heat resistance	150°C (for 1 hour)
Max. continuous current	10 A (DK1a-PS, DK1a-PSL2), 8 A (DK2a-PS, DK2a-PSL2)

DIMENSIONS (mm inch)

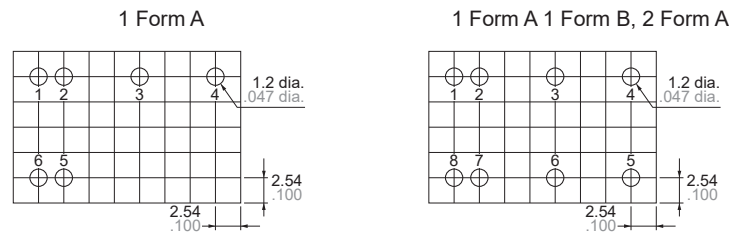
CAD

External dimensions



CAD The CAD data of the products with a "CAD" mark can be downloaded from our Website.

PC board pattern (Bottom view)



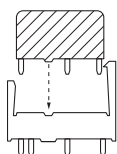
Tolerance: $\pm 0.1 \pm 0.04$

Note: The above shows 2 coil latching type.
No.2 and 5 terminal are eliminated on single side stable type.

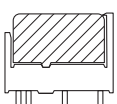
Note: The above shows 2 coil latching type.
No.2 and 7 terminal are eliminated on single side stable type.

FIXING AND REMOVAL METHOD

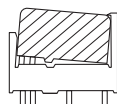
1. Match the direction of relay and socket.



2. Both ends of the relay are to be secured firmly so that the socket hooks on the top surface of the relay.

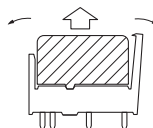


GOOD

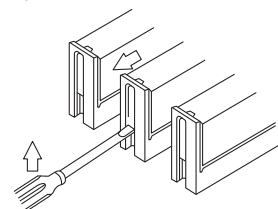


NO GOOD

3. Remove the relay, applying force in the direction shown below.



4. In case there is not enough space to grasp relay with fingers, use screwdrivers in the way shown below.



Notes: 1. Exercise care when removing relays. If greater than necessary force is applied at the socket hooks, deformation may alter the dimensions so that the hook will no longer catch, and other damage may also occur.
2. It is hazardous to use IC chip sockets.

GUIDELINES FOR POWER RELAYS AND HIGH-CAPACITY DC CUT OFF RELAYS USAGE

For cautions for use, please read “GUIDELINES FOR RELAY USAGE”.

https://industrial.panasonic.com/ac/e/control/relay/cautions_use/index.jsp

Precautions for Coil Input

■ Long term current carrying

A circuit that will be carrying a current continuously for long periods without relay switching operation. (circuits for emergency lamps, alarm devices and error inspection that, for example, revert only during malfunction and output warnings with form B contacts) Continuous, long-term current to the coil will facilitate deterioration of coil insulation and characteristics due to heating of the coil itself.

For circuits such as these, please use a magnetic-hold type latching relay. If you need to use a single stable relay, use a sealed type relay that is not easily affected by ambient conditions and make a failsafe circuit design that considers the possibility of contact failure or disconnection.

■ DC Coil operating power

Steady state DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%.

However, please check with the actual circuit since the electrical characteristics may vary. The rated coil voltage should be applied to the coil and the set/reset pulse time of latching type relay differs for each relays, please refer to the relay's individual specifications.

■ Coil connection

When connecting coils of polarized relays, please check coil polarity (+,-) at the internal connection diagram (Schematic). If any wrong connection is made, it may cause unexpected malfunction, like abnormal heat, fire and so on, and circuit do not work. Avoid impressing voltages to the set coil and reset coil at the same time.

Ambient Environment

● Usage, Transport, and Storage Conditions

During usage, storage, or transportation, avoid locations subjected to direct sunlight and maintain normal temperature, humidity and pressure conditions.

● Temperature/Humidity/Pressure

When transporting or storing relays while they are tube packaged, there are cases the temperature may differ from the allowable range. In this case be sure to check the individual specifications. Also allowable humidity level is influenced by temperature, please check charts shown below and use relays within mentioned conditions. (Allowable temperature values differ for each relays, please refer to the relay's individual specifications.)

1) Temperature:

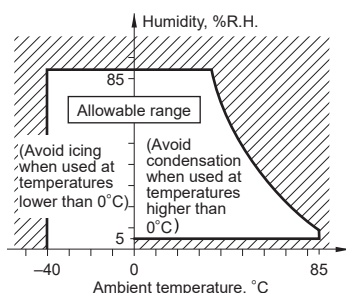
The tolerance temperature range differs for each relays, please refer to the relay's individual specifications

2) Humidity:

5 to 85 % RH

3) Pressure:

86 to 106 kPa



■ Maximum allowable voltage and temperature rise

Proper usage requires that the rated coil voltage be impressed on the coil. Note, however, that if a voltage greater than or equal to the maximum continuous voltage is impressed on the coil, the coil may burn or its layers short due to the temperature rise. Furthermore, do not exceed the usable ambient temperature range listed in the catalog.

■ Operate voltage change due to coil temperature rise (Hot start)

In DC relays, after continuous passage of current in the coil, if the current is turned OFF, then immediately turned ON again, due to the temperature rise in the coil, the pick-up voltage will become somewhat higher. Also, it will be the same as using it in a higher temperature atmosphere. The resistance/temperature relationship for copper wire is about 0.4% for 1°C, and with this ratio the coil resistance increases. That is, in order to operate of the relay, it is necessary that the voltage be higher than the pick-up voltage and the pick-up voltage rises in accordance with the increase in the resistance value. However, for some polarized relays, this rate of change is considerably smaller.

● Dew condensation

Condensation occurs when the ambient temperature drops suddenly from a high temperature and humidity, or the relay is suddenly transferred from a low ambient temperature to a high temperature and humidity. Condensation causes the failures like insulation deterioration, wire disconnection and rust etc. Panasonic Corporation does not guarantee the failures caused by condensation.

The heat conduction by the equipment may accelerate the cooling of device itself, and the condensation may occur.

Please conduct product evaluations in the worst condition of the actual usage. (Special attention should be paid when high temperature heating parts are close to the device. Also please consider the condensation may occur inside of the device.)

● Icing

Condensation or other moisture may freeze on relays when the temperature become lower than 0°C. This icing causes the sticking of movable portion, the operation delay and the contact conduction failure etc. Panasonic Corporation does not guarantee the failures caused by the icing.

The heat conduction by the equipment may accelerate the cooling of relay itself and the icing may occur. Please conduct product evaluations in the worst condition of the actual usage.

● Low temperature and low humidity

The plastic becomes brittle if the switch is exposed to a low temperature, low humidity environment for long periods of time.

● High temperature and high humidity

Storage for extended periods of time (including transportation periods) at high temperature or high humidity levels or in atmospheres with organic gases or sulfide gases may cause a sulfide film or oxide film to form on the surfaces of the contacts and/or it may interfere with the functions. Check out the atmosphere in which the units are to be stored and transported.

GUIDELINES FOR POWER RELAYS AND HIGH-CAPACITY DC CUT OFF RELAYS USAGE

●Package

In terms of the packing format used, make every effort to keep the effects of moisture, organic gases and sulfide gases to the absolute minimum.

●Silicon

When a source of silicone substances (silicone rubber, silicone oil, silicone coating materials and silicone filling materials etc.) is used around the relay, the silicone gas (low molecular siloxane etc.) may be produced.

This silicone gas may penetrate into the inside of the relay. When the relay is kept and used in this condition, silicone compound may adhere to the relay contacts which may cause the contact failure. Do not use any sources of silicone gas around the relay (Including plastic seal types).

●NOx Generation

When relay is used in an atmosphere high in humidity to switch a load which easily produces an arc, the NOx created by the arc and the water absorbed from outside the relay combine to produce nitric acid. This corrodes the internal metal parts and adversely affects operation. Avoid use at an ambient humidity of 85%RH or higher (at 20°C). If use at high humidity is unavoidable, please contact our sales representative.

Others

■Cleaning

- 1) Although the environmentally sealed type relay (plastic sealed type, etc.) can be cleaned, avoid immersing the relay into cold liquid (such as cleaning solvent) immediately after soldering. Doing so may deteriorate the sealing performance.
- 2) Cleaning with the boiling method is recommended(The temperature of cleaning liquid should be 40°C or lower).
Avoid ultrasonic cleaning on relays. Use of ultrasonic cleaning may cause breaks in the coil or slight sticking of the contacts due to ultrasonic energy.

Please refer to "**the latest product specifications**" when designing your product.

•Requests to customers:

<https://industrial.panasonic.com/ac/e/salespolicies/>

Please contact

Panasonic Corporation

Electromechanical Control Business Division

■ 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8506, Japan
industrial.panasonic.com/ac/e/

Panasonic[®]

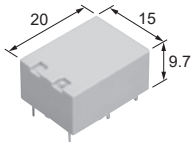
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Electrical life: Min. 2×10^5
1 Form A 10A, 1 Form A
1 Form B 8A small
polarized power relays

DY RELAYS (ADY)

Protective construction: Sealed type



mm

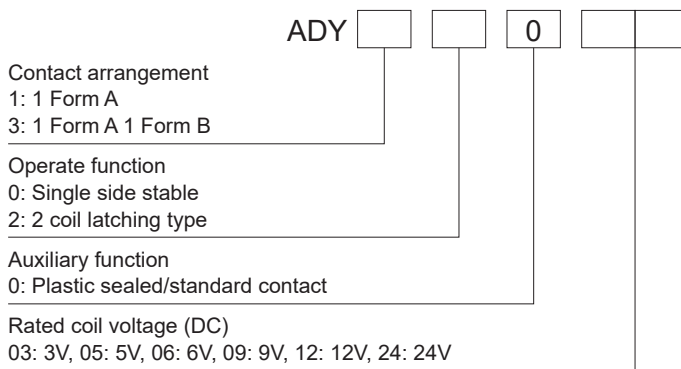
FEATURES

- High capacity**
 1 Form A (10A 250V AC),
 1 Form A 1 Form B (8A 250V AC)
- Long insulation distance**
 Reinforced insulation with 6 mm
 distance between input and output
- Variety of contact arrangements**
 Wide lineup of 1 Form A, 1 Form A
 A Form B
- Sockets are available**
- Latching types available**

TYPICAL APPLICATIONS

- Control for industrial machines
- Output relays for temperature
- Measuring equipment
- Security equipment

ORDERING INFORMATION



TYPES

Contact arrangement	Rated coil voltage	Part No.		Standard packing	
		Single side stable	2 coil latching	Carton	Case
1 Form A	3V DC	ADY10003	ADY12003	50 pcs.	500 pcs.
	5V DC	ADY10005	ADY12005		
	6V DC	ADY10006	ADY12006		
	9V DC	ADY10009	ADY12009		
	12V DC	ADY10012	ADY12012		
	24V DC	ADY10024	ADY12024		
1 Form A 1 Form B	3V DC	ADY30003	ADY32003		
	5V DC	ADY30005	ADY32005		
	6V DC	ADY30006	ADY32006		
	9V DC	ADY30009	ADY32009		
	12V DC	ADY30012	ADY32012		
	24V DC	ADY30024	ADY32024		

RATING

1. Coil data

- Operating characteristics such as 'Operate voltage' and 'Release voltage' are influenced by mounting conditions, ambient temperature, etc. Therefore, please use the relay within $\pm 5\%$ of rated coil voltage.
- 'Initial' means the condition of products at the time of delivery.

1) Single side stable

Rated coil voltage	Operate voltage* (at 20°C)	Release voltage* (at 20°C)	Rated operating current [$\pm 10\%$] (at 20°C)	Coil resistance [$\pm 10\%$] (at 20°C)	Rated operating power	Max. allowable voltage (at 20°C)
3V DC	70%V or less of rated coil voltage (Initial)	10%V or more of rated coil voltage (Initial)	66.6mA	45 Ω	200mW	130%V of rated coil voltage
5V DC			40 mA	125 Ω		
6V DC			33.3mA	180 Ω		
9V DC			22.2mA	405 Ω		
12V DC			16.6mA	720 Ω		
24V DC			8.3mA	2,880 Ω		

Note: * Square, pulse drive

2) 2 coil latching

Rated coil voltage	Set voltage* (at 20°C)	Reset voltage* (at 20°C)	Rated operating current [$\pm 10\%$] (at 20°C)		Coil resistance [$\pm 10\%$] (at 20°C)		Rated operating power		Max. allowable voltage (at 20°C)
			Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
3V DC	70%V or less of rated coil voltage (Initial)	70%V or less of rated coil voltage (Initial)	66.6mA	66.6mA	45 Ω	45 Ω	200mW	200mW	130%V of rated coil voltage
5V DC			40 mA	40 mA	125 Ω	125 Ω			
6V DC			33.3mA	33.3mA	180 Ω	180 Ω			
9V DC			22.2mA	22.2mA	405 Ω	405 Ω			
12V DC			16.6mA	16.6mA	720 Ω	720 Ω			
24V DC			8.3mA	8.3mA	2,880 Ω	2,880 Ω			

Note: * Square, pulse drive

2. Specifications

Item		Specifications	
Contact data	Contact arrangement	1 Form A	1 Form A 1 Form B
	Contact resistance (Initial)	Max. 30 m Ω (By voltage drop 6 V DC 1A)	
	Contact material	Au-flashed AgSnO ₂ type	
	Contact rating (Resistive)	10A 250V AC, 10A 30V DC	8A 250V AC, 8A 30V DC
	Max. switching power (Resistive)	2,500VA, 300W	2,000VA, 240W
	Max. switching voltage	250V AC, 125V DC (0.2A)	
	Max. switching current	10 A	8 A
	Min. switching load (Reference value)*1	5V 10mA	
Insulation resistance (Initial)	Min. 1,000 M Ω (at 500 V DC) Measured portion is the same as the case of dielectric strength		
Dielectric strength (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	4,000 Vrms for 1 min. (Detection current: 10 mA)	
Surge withstand voltage (Initial)*2	Between contact and coil	10,000 V	
Time characteristics	Operate time [Set time] (Initial)	Max. 10 ms [10ms] (at rated coil voltage, at 20°C, without bounce)	
	Release time [Reset time] (Initial)	Max. 8ms [10ms] (at rated coil voltage, at 20°C, without bounce, without diode)	
Shock resistance	Functional	Min. 98 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10 μ s.)	
	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 1.5 mm (Detection time: 10 μ s.)	
	Destructive	10 to 55 Hz at double amplitude of 3 mm	
Expected life	Mechanical	Min. 5 $\times 10^7$ (at 300 times/min)	
Conditions	Conditions for operation, transport and storage*3	Ambient temperature: -40°C to +70°C Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)	
Unit weight	Approx. 6 g		

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

*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.

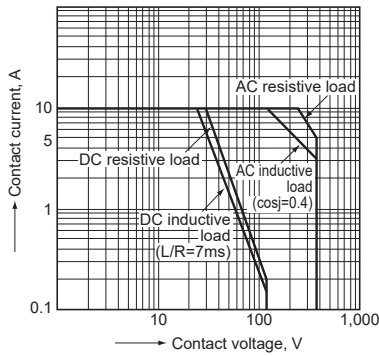
3. Expected electrical life

Condition: Resistive, at 20 times/min.

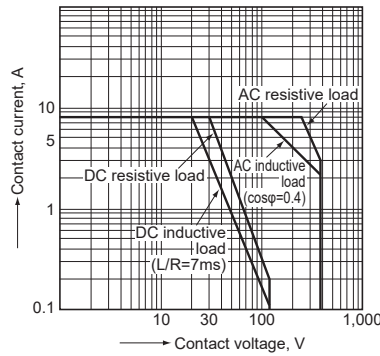
Type	Switching capacity	Number of operations
1 Form A	10A 250V AC 10A 30V DC	Min. 1 $\times 10^5$
1 Form A 1 Form B	8A 250V AC 8A 30V DC	Min. 1 $\times 10^5$

REFERENCE DATA

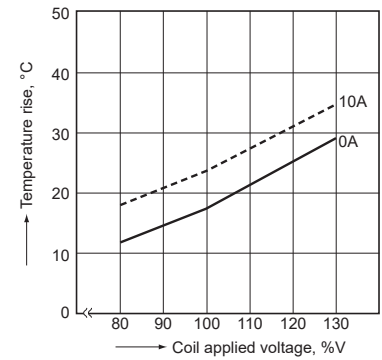
1-(1). Max. switching capacity
(1 Form A)
Tested sample: ADY10024



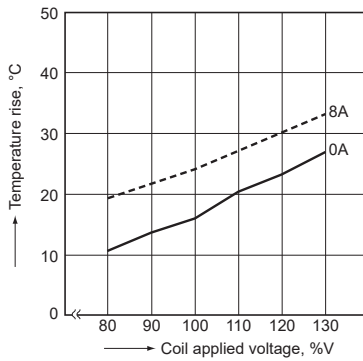
1-(2). Max. switching capacity
(1 Form A 1 Form B)
Tested sample: ADY30024



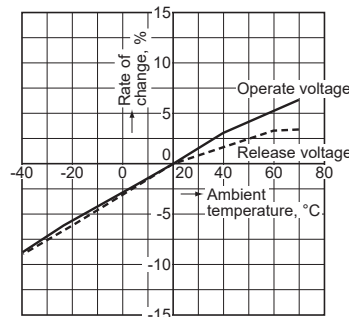
2-(1). Coil temperature rise
(1 Form A)
Tested sample: ADY10024, 6 pcs.
Ambient temperature: 20°C



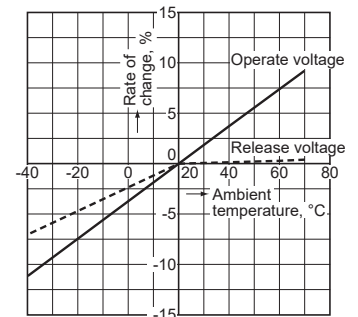
2-(2). Coil temperature rise
(1 Form A 1 Form B)
Tested sample: ADY30024, 6 pcs.
Ambient temperature: 20°C



3-(1). Ambient temperature characteristics
(1 Form A)
Tested sample: ADY10024, 6 pcs.
Ambient temperature: -40°C to 70°C



3-(2). Ambient temperature characteristics
(1 Form A 1 Form B)
Tested sample: ADY30024, 6 pcs.
Ambient temperature: -40°C to 70°C



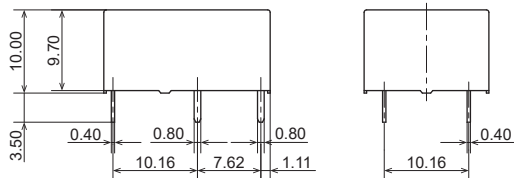
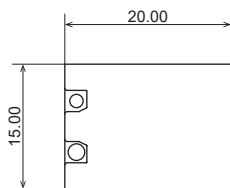
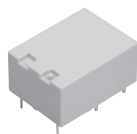
DIMENSIONS (mm)

1.1 Form A type

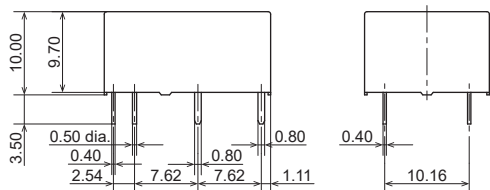
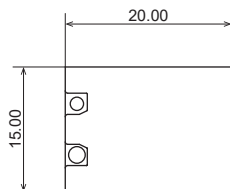
CAD

External dimensions

Single side stable type



2 coil latching type

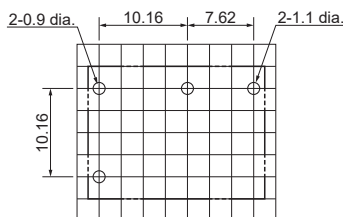


General tolerance: ± 0.3

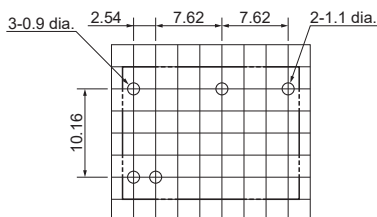
CAD The CAD data of the products with a "CAD" mark can be downloaded from our Website.

PC board pattern
(BOTTOM VIEW)

Single side stable type



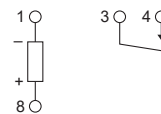
2 coil latching type



Tolerance: ± 0.1

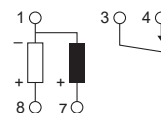
Schematic
(BOTTOM VIEW)

Single side stable



(Deenergized condition)

2 coil latching type



(Reset condition)

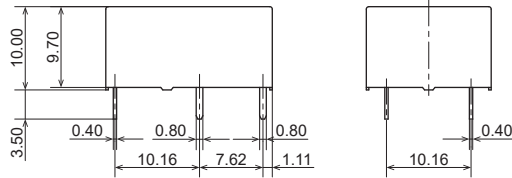
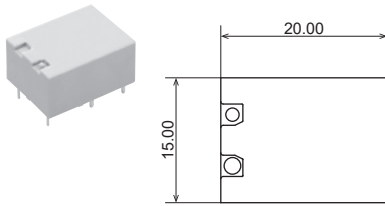
Since this is a polarized relay, the connection to the coil should be done according to the above schematic.

2. 1 Form A 1 Form B type

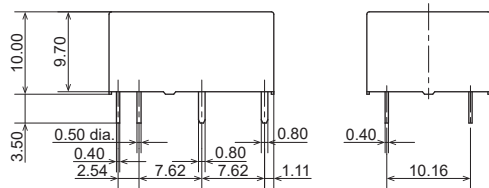
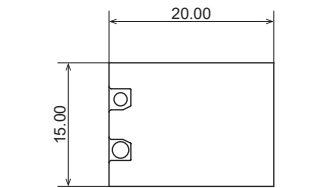
CAD

External dimensions

Single side stable type



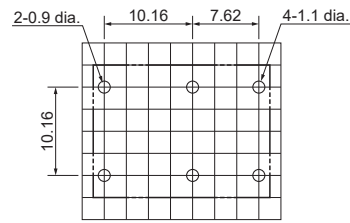
2 coil latching type



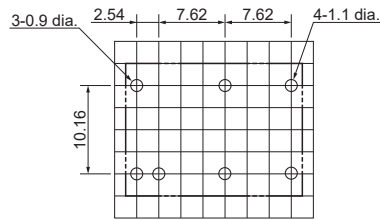
General tolerance: ±0.3

PC board pattern (BOTTOM VIEW)

Single side stable type



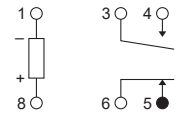
2 coil latching type



Tolerance: ±0.1

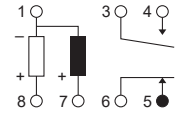
Schematic (BOTTOM VIEW)

Single side stable



(Deenergized condition)

2 coil latching type



(Reset condition)

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

SAFETY STANDARDS

■UL (Recognized)

1 Form A

File No.	Contact rating
E43028	10A 250V AC
	10A 30V DC
	1/3HP 125, 250V AC

■CSA (Certified)

1 Form A

File No.	Contact rating
LR26550	10A 250V AC
	10A 30V DC
	1/3HP 125, 250V AC

■TÜV (Certified)

1 Form A

File No.	Contact rating
B 11 12 13461 314	10A 250V AC (cosφ =1.0)
	10A 30V DC (0ms)

1 Form A 1 Form B

File No.	Contact rating
E43028	8A 250V AC
	8A 30V DC
	1/4HP 125, 250V AC

1 Form A 1 Form B

File No.	Contact rating
LR26550	8A 250V AC
	8A 30V DC
	1/4HP 125, 250V AC

1 Form A 1 Form B

File No.	Contact rating
B 11 12 13461 314	8A 250V AC (cosφ =1.0)
	8A 30V DC (0ms)

NOTES

1. For cautions for use, please read "GENERAL APPLICATION GUIDELINES".
2. Specification value of operate [set] voltage and release [reset] voltage were measured with a relay oriented terminal down.
3. In case of using this relay, 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.
4. Regarding the set/reset pulse time of the latching type relay, it is recommended to apply rated coil voltage for minimum 50ms pulse across the coil to secure the sure operation considering the ambient temperature and condition change through service life.

Please refer to **"the latest product specifications"** when designing your product.

- Requests to customers :
<https://industrial.panasonic.com/ac/e/salespolicies/>

ACCESSORIES

SOCKET FOR DY RELAY



TYPES

Type	Part No.		Standard packing	
	Single side stable	2 coil latching	Carton	Case
1 Form A	DK1a-PS	DK1a-PSL2	50 pcs.	500 pcs.
1 Form A 1 Form B	DK2a-PS	DK2a-PSL2		

RELAY COMPATIBILITY

Relay	Socket	1 Form A		1 Form A 1 Form B	
		Single side stable	2 coil latching	Single side stable	2 coil latching
1 Form A	Single side stable	●	●	-	-
	2 coil latching	-	●	-	-
1 Form A 1 Form B	Single side stable	-	-	●	●
	2 coil latching	-	-	-	●

SPECIFICATIONS

Item	Specifications	
Contact arrangement	1 Form A	1 Form A 1 Form B
Dielectric strength (Initial)	4,000 Vrms (Detection current: 10 mA) (Except the portion between coil terminals)	
Insulation resistance (Initial)	Min. 1,000 mΩ (at 500 V DC)	
Max. continuous current	10 A	8 A
Conditions for operation, transport and storage	Ambient temperature: -40 to 65°C Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)	

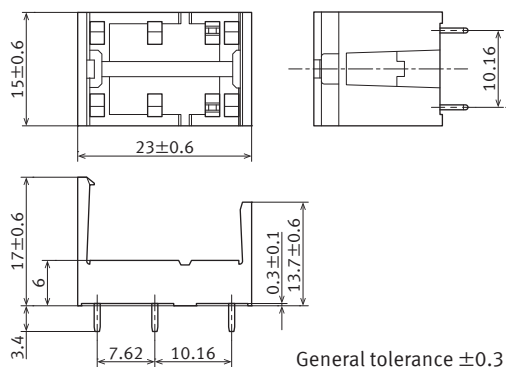
DIMENSIONS (mm)

CAD The CAD data of the products with a "CAD" mark can be downloaded from our Website.

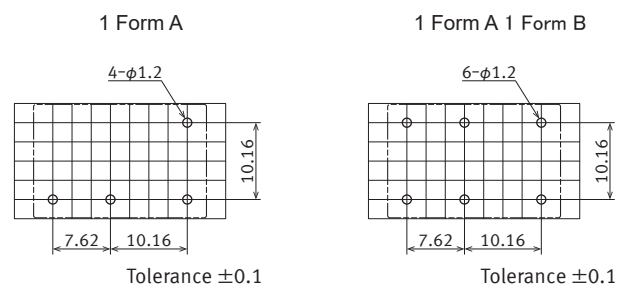
Single side stable

CAD

External dimensions



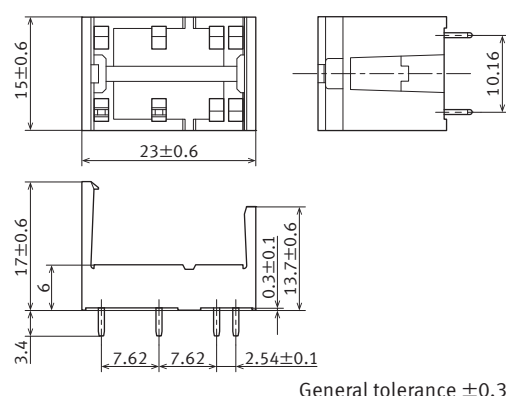
PC board pattern (Bottom view)



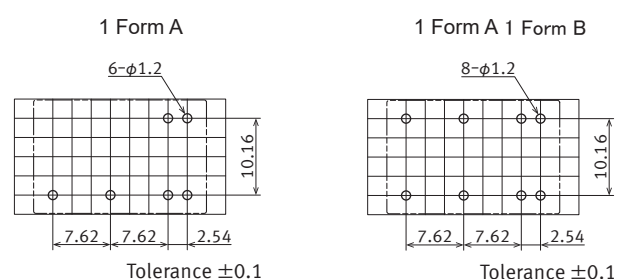
2 coil latching

CAD

External dimensions



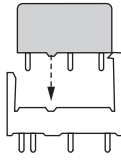
PC board pattern (Bottom view)



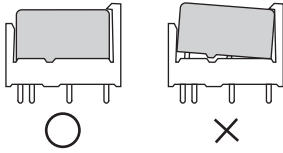
NOTE

■ Fixing method of relay

1. Match the direction of relay and socket.

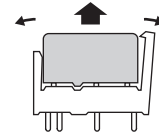


2. Both ends of the relay are to be secured firmly so that the socket hooks on the top surface of the relay.

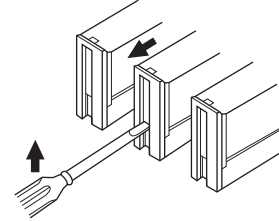


■ Removal method of relay

1. Remove the relay, applying force in the direction shown below.



2. In case there is not enough space to grasp relay with fingers, use screwdrivers in the way shown below.



3. Exercise care when removing relays. If greater than necessary force is applied at the socket hooks, deformation may alter the dimensions so that the hook will no longer catch, and other damage may also occur.

4. It is hazardous to use IC chip sockets.

Please refer to **"the latest product specifications"** when designing your product.

•Requests to customers:

<https://industrial.panasonic.com/ac/e/salespolicies/>

GUIDELINES FOR POWER RELAYS AND HIGH-CAPACITY DC CUT OFF RELAYS USAGE

For cautions for use, please read “GUIDELINES FOR RELAY USAGE”.

https://industrial.panasonic.com/ac/e/control/relay/cautions_use/index.jsp

Precautions for Coil Input

■ Long term current carrying

A circuit that will be carrying a current continuously for long periods without relay switching operation. (circuits for emergency lamps, alarm devices and error inspection that, for example, revert only during malfunction and output warnings with form B contacts) Continuous, long-term current to the coil will facilitate deterioration of coil insulation and characteristics due to heating of the coil itself.

For circuits such as these, please use a magnetic-hold type latching relay. If you need to use a single stable relay, use a sealed type relay that is not easily affected by ambient conditions and make a failsafe circuit design that considers the possibility of contact failure or disconnection.

■ DC Coil operating power

Steady state DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%.

However, please check with the actual circuit since the electrical characteristics may vary. The rated coil voltage should be applied to the coil and the set/reset pulse time of latching type relay differs for each relays, please refer to the relay's individual specifications.

■ Coil connection

When connecting coils of polarized relays, please check coil polarity (+,-) at the internal connection diagram (Schematic). If any wrong connection is made, it may cause unexpected malfunction, like abnormal heat, fire and so on, and circuit do not work. Avoid impressing voltages to the set coil and reset coil at the same time.

Ambient Environment

● Usage, Transport, and Storage Conditions

During usage, storage, or transportation, avoid locations subjected to direct sunlight and maintain normal temperature, humidity and pressure conditions.

● Temperature/Humidity/Pressure

When transporting or storing relays while they are tube packaged, there are cases the temperature may differ from the allowable range. In this case be sure to check the individual specifications. Also allowable humidity level is influenced by temperature, please check charts shown below and use relays within mentioned conditions. (Allowable temperature values differ for each relays, please refer to the relay's individual specifications.)

1) Temperature:

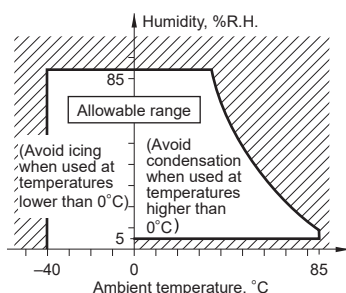
The tolerance temperature range differs for each relays, please refer to the relay's individual specifications

2) Humidity:

5 to 85 % RH

3) Pressure:

86 to 106 kPa



■ Maximum allowable voltage and temperature rise

Proper usage requires that the rated coil voltage be impressed on the coil. Note, however, that if a voltage greater than or equal to the maximum continuous voltage is impressed on the coil, the coil may burn or its layers short due to the temperature rise. Furthermore, do not exceed the usable ambient temperature range listed in the catalog.

■ Operate voltage change due to coil temperature rise (Hot start)

In DC relays, after continuous passage of current in the coil, if the current is turned OFF, then immediately turned ON again, due to the temperature rise in the coil, the pick-up voltage will become somewhat higher. Also, it will be the same as using it in a higher temperature atmosphere. The resistance/temperature relationship for copper wire is about 0.4% for 1°C, and with this ratio the coil resistance increases. That is, in order to operate of the relay, it is necessary that the voltage be higher than the pick-up voltage and the pick-up voltage rises in accordance with the increase in the resistance value. However, for some polarized relays, this rate of change is considerably smaller.

● Dew condensation

Condensation occurs when the ambient temperature drops suddenly from a high temperature and humidity, or the relay is suddenly transferred from a low ambient temperature to a high temperature and humidity. Condensation causes the failures like insulation deterioration, wire disconnection and rust etc. Panasonic Corporation does not guarantee the failures caused by condensation.

The heat conduction by the equipment may accelerate the cooling of device itself, and the condensation may occur.

Please conduct product evaluations in the worst condition of the actual usage. (Special attention should be paid when high temperature heating parts are close to the device. Also please consider the condensation may occur inside of the device.)

● Icing

Condensation or other moisture may freeze on relays when the temperature become lower than 0°C. This icing causes the sticking of movable portion, the operation delay and the contact conduction failure etc. Panasonic Corporation does not guarantee the failures caused by the icing.

The heat conduction by the equipment may accelerate the cooling of relay itself and the icing may occur. Please conduct product evaluations in the worst condition of the actual usage.

● Low temperature and low humidity

The plastic becomes brittle if the switch is exposed to a low temperature, low humidity environment for long periods of time.

● High temperature and high humidity

Storage for extended periods of time (including transportation periods) at high temperature or high humidity levels or in atmospheres with organic gases or sulfide gases may cause a sulfide film or oxide film to form on the surfaces of the contacts and/or it may interfere with the functions. Check out the atmosphere in which the units are to be stored and transported.

●Package

In terms of the packing format used, make every effort to keep the effects of moisture, organic gases and sulfide gases to the absolute minimum.

●Silicon

When a source of silicone substances (silicone rubber, silicone oil, silicone coating materials and silicone filling materials etc.) is used around the relay, the silicone gas (low molecular siloxane etc.) may be produced.

This silicone gas may penetrate into the inside of the relay. When the relay is kept and used in this condition, silicone compound may adhere to the relay contacts which may cause the contact failure. Do not use any sources of silicone gas around the relay (Including plastic seal types).

●NOx Generation

When relay is used in an atmosphere high in humidity to switch a load which easily produces an arc, the NOx created by the arc and the water absorbed from outside the relay combine to produce nitric acid. This corrodes the internal metal parts and adversely affects operation. Avoid use at an ambient humidity of 85%RH or higher (at 20°C). If use at high humidity is unavoidable, please contact our sales representative.

Others

■Cleaning

- 1) Although the environmentally sealed type relay (plastic sealed type, etc.) can be cleaned, avoid immersing the relay into cold liquid (such as cleaning solvent) immediately after soldering. Doing so may deteriorate the sealing performance.
- 2) Cleaning with the boiling method is recommended(The temperature of cleaning liquid should be 40°C or lower).
Avoid ultrasonic cleaning on relays. Use of ultrasonic cleaning may cause breaks in the coil or slight sticking of the contacts due to ultrasonic energy.

Please refer to **"the latest product specifications"** when designing your product.

•Requests to customers:

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